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[The Association as a body is not responsible for statements or opinions of any of its members.]

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THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH was organized in Boston, March, 1890, *with the following objects: the advancement of sanitary science; the promotion of better organization and co-operation among local boards of health, and the uniform enforcement of sanitary laws and regulations.*

THE JOURNAL OF THIS ASSOCIATION has for fourteen years faithfully reflected the views of the public hygienists of Massachusetts. As the only one of its kind in Massachusetts, the Journal has had its own field, which, however, it has not yet fully occupied. With the October issue of the year 1903, *a policy of expansion was adopted. The subscription list showed an immediate and most gratifying increase, so that this, the fourth issue has a total circulation of over* 1,200 *copies.*

In order that the Journal may appear within the next month after each quarterly meeting of the Association, the dates of publication will be FEBRUARY, MAY, AUGUST *and* NOVEMBER *of each year.*

THE JOURNAL will contain the papers read at the meetings of the Association, verbatim reports of the discussions, editorials, abstracts, reviews and hygienic notes of professional interest. Subscription rates, $1.00 *per year. Reprints furnished at cost price.*

All communications concerning the ASSOCIATION should be addressed to the Secretary of the Association, JAMES C. COFFEY, CITY HALL, WORCESTER, MASS.

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EDITORIALS.

THE UNITED STATES SOCIETY FOR THE STUDY OF TUBERCULOSIS.

The appointment of a committee, composed of Drs. Trudeau, Biggs, Welch, Sternberg, Flick, Osler, and Jacobs, to draw up a Constitution and By-Laws for the new "United States Society for the Study of Tuberculosis," by a meeting of those interested in the tuberculosis problem, held in Philadelphia on March 28th, is the final outcome of a struggle which has been going on for over a year between the various interests in that field of endeavor.

At the meeting of the American Congress Tuberculosis held in New York city in the spring of 1902, the President of the Congress, Dr. Henry Holton, and some of his prominent associates, became deeply impressed with the fact that the interests of the crusade against tuberculosis would best be served by an entire reorganization of the Congress. This they attempted to bring about by the election of an entirely new list of officers, which was accomplished in a perfectly proper and legal manner. Dr. Daniel Lewis, Health Commissioner, was induced to accept the presidency of the Congress and Dr. George Brown of Atlanta, Ga., was chosen Secretary. After the adjournment of the Congress the former Secretary, Mr. Clark Bell, refused to be governed by the action of the Congress in electing new officers, declining to recognize their appointment, and soon after claiming that the real officers were elected after the adjournment by a so-called "Executive Committee," the formation of which and the authority for which is shrouded in mystery.

The officers regularly elected by the Congress applied for and received articles of incorporation as officers of the American

Congress on Tuberculosis, and became thereby the only organization entitled to the use of that name. Notwithstanding this, however, the mysteriously created "Executive Committee" and its appointees continued to use that name, and in addition settled upon St. Louis in the summer of 1904 as the time of their meeting, which was the place, and practically the time decided upon by the regular officers of the incorporated Congress for the holding of its meeting.

Not wishing to enter into an open conflict with the organization so mysteriously created, the officers of the incorporated Congress decided at a meeting held on May 7th, 1903, to eliminate one element of confusion by postponing the time and changing the place of meeting to April, 1905, and Washington, D. C. They were also influenced in making this decision by the fact that the International Congress on Tuberculosis was planning to meet in Paris in 1904, and they did not desire their meeting to conflict with it. At the same meeting the officers appointed a committee of some of the leading scientific workers in the profession to direct the more scientific work of the Congress, and they further decided to invite all the medical organizations whose members were eligible for membership in the American Medical Association to send delegates to the Congress.

At the Washington meeting of the American Public Health Association in October of last year, members of the staff of the Henry Phipps Institute endeavored to enlist support for the organization of a new national tuberculosis society for the express purpose of inviting the International Congress on Tuberculosis to hold a meeting in this country in 1905, it being stated that acceptance of the invitation was already assured. The supporters of this movement were entirely opposed to union or affiliation with any existing American anti-tuberculosis organization. Much to their surprise it was soon announced that the Paris meeting of the International Congress had been postponed until 1905 on the plea of not desiring to conflict with the meeting of the so-called "Clark Bell Congress" in St. Louis.

To the difficult task of endeavoring to bring order out of this chaos, a physician, Dr. Knopf, whose name has for several years been a prominent one in anti-tuberculosis literature, directed his efforts by sending an open letter to some of the weekly medical journals in which he outlined the situation, and commented freely on what he considered to be the deficiencies in the lists of prominent supporters of some of the existing organizations. He also issued a call for "all interested" to meet in Baltimore on January 29th. While "all interested" may not have been present, there were indications that, had circumstances permitted, several distinct national organizations would have been projected before the end of the meeting.

The most decided effort to produce harmony was the submission of an offer of the American Congress on Tuberculosis through its President, Dr. Daniel Lewis, to permit a committee, of some of the persons present at this meeting, to assume charge of the affairs of their organization and do with it what seemed best for the general interests involved. Towards this end Dr. Lewis stated that the Congress had changed its corporate name to American Anti-Tuberculosis League at the suggestion of one of the prominent supporters of the Phipps Institute plan.

From the tone of the discussion it became apparent to all that nothing could be settled at that meeting, and under the masterful direction of Dr. Welch the meeting finally voted to submit the whole question to a Committee to be appointed by the Chairman, and to be bound by its decision.

The members of this Committee, which included Drs. Biggs, Osler, Trudeau, Theobald Smith, Bowditch, Knopf, Jacobs, Bracken, Flick, and Ravenel, met subsequently in New York, and after some discussion it was generally understood that a large majority of the Committee were favorable to the plan of accepting the offer of the President of the Anti-Tuberculosis League made at the Baltimore meeting. It was considered wise, however, before settling the matter definitely, to enlarge the membership of the Committee, and to hold another meeting.

Advantage of this change was taken by those supporting the

Phipps Institute movement, who had from the first vigorously opposed affiliation with any existing organization, by inviting the Committee to hold their next meeting in Philadelphia on the date previously set for the presentation of a paper by Dr. Maragliano before the Phipps Institute.

The enlargement of the Committee naturally increased the Philadelphia representation upon it, and the holding of the meeting in that city insured the entire attendance of that representation while lessening the attendance from distant points, so that by actual count fifty per cent. of the persons present resided in Philadelphia or vicinity. With the assistance of a few ardent supporters from outside of their district, the Philadelphians were manifestly in control of the meeting, and it was seen beforehand that it would be useless to attempt to follow the plan of recommending affiliation with the Anti-Tuberculosis League, which had been deemed the wisest course by a majority of the Committee as originally constituted.

The struggle attending the birth of the Society, and the experience and results obtained from the Tuberculosis Exhibition and series of lectures held in Baltimore, have shown conclusively the need of an organization which will bring to the immediate attention of the profession as a whole and to the general public the essential truths concerning the nature, dissemination, prevention and treatment of the great plague.

That the United States Society for the Study of Tuberculosis will be a well conducted, thoroughly scientific and valuable organization no one questions for an instant. We hope that it will not confine itself to the scientific and more detailed clinical study of the tuberculosis problem, but will, as well, conduct a campaign of education for the benefit of the mass of the medical profession and the public, which was the aim and object of the American Anti-Tuberculosis League.

UNIFORM STANDARDS IN PUBLIC HEALTH ADMINISTRATION.

An excellent editorial on this subject in the *Journal of the American Medical Association* calls attention to the very vary-

ing practice in the large cities regarding the reporting of infectious diseases, the placarding of houses, and the extent of isolation required. The editorial urges that some understanding should be reached resulting in uniformity of procedure, and recommends that the American Medical Association should take up the consideration of the subject.

The ASSOCIATION which this JOURNAL represents was founded to promote uniformity of precedure amongst the local Boards of Health of this State, and it is therefore fully in sympathy with the general principles advocated by our contemporary. Of five or six different procedures only one can be the best. To find this best and to adopt it should be the aim of all interested in hygienic administration. The recommendation that this subject should be taken up by the American Medical Association involves, however, an unintentional but none the less poignant reflection, perhaps not altogether undeserved, on the hygienic associations of this country. It is reform from within, and not under compulsion from without, that is the best and most sincere, as well as the most creditable and encouraging. In hygienic matters the reforms should be initiated and carried out by the hygienists themselves. The American Public Health Association, the Conference of State Boards of Health and the local State hygienic societies constitute bodies not only the best informed on these subjects but the most likely to have weight with the public hygienists generally. The American Medical Association, representing the medical profession as a whole, is entitled to, and does, carry great weight, but the hygienic associations represent specialists in hygiene who have evolved, many of them from the medical profession, and it is no more proper that the American Medical Association should recommend procedures to the public hygienists than that the American Medical Association should recommend procedures to their own ophthalmological section or to their section of pathology and bacteriology.

The fact that official public hygienists have been slow in securing national or even State uniformity in many details furnishes,

perhaps, some excuse for an appeal elsewhere. The fact that such an appeal has been made should be a sufficient spur to us in this at present rather neglected line.

MEDICAL INSPECTION OF SCHOOLS.

American Medicine, Feb. 27, '04, contains this item in the column on "Foreign News and Notes":

"MEDICAL SCHOOL INSPECTION ABROAD.—An exchange says: The foreign custom, universal in France and Germany, of insisting upon each child entering school, and at regular intervals thereafter submitting to a medical examination, is an example worthy of emulation in vaunted up-to-date communities. The question of vaccination and the control of contagious epidemic are the only occasions when medical intervention is usual in the schools in this country. Abroad it is customary to appoint school physicians, whose duty it is to examine twice a year all the pupils with reference to the senses, the spinal column, the development of the limbs, and to make recommendations for their special instruction on account of stuttering, etc. Not their least important work is the quarterly or in some cities semi-monthly sanitary inspection of school rooms and buildings. It is one of the duties of teachers to call the attention of the school physician to any pupils whose state of health during the interval since the previous visit creates suspicion. The physician can, however, in case of sick pupils, only notify the parents formally of the child's condition, their treatment being left entirely in the hands of the family physician. It is proposed by the French medical fraternity to have the school physician's duties extended to an inspection of the condition of the dwellings of sick school children, and also to give advice concerning the architecture of schools and the division of school hours."

The medical inspections thus vaunted are at most semi-monthly. It is interesting to compare this item, written recently, with the following paragraphs from a paper by Dr. E. M. Greene, Philadelphia Medical Journal, Feb. 16, 1901.

"The first city in this country, or abroad, to establish a system of daily medical inspection in all the public schools was Boston. Since then similar methods of inspection have been adopted in New York City, Chicago, and in most of the large cities, as well as in many of the smaller towns. Within a few years we may expect to see some method of medical inspection in general used throughout the country. The important questions are how comprehensive and searching an inspection is desirable, or practicable, and how to organize and conduct the work in the most efficient manner.

Medical inspection of schools, both public and parochial, was begun in Boston in the fall of 1894, and was secured only as the result of 4 years of persistent effort on the part of the efficient and progressive chairman of the Boston Board of Health, Dr. Samuel H. Durgin. The immediate occasion which made his appeals successful was the unusual prevalence of diphtheria in Boston during the year 1894.

The system of inspection is under the control of the Board of Health. The School Committee co-operates cordially in the work, by giving permission for inspectors to enter the school buildings and examine pupils, and by directing teachers to watch for cases of illness and to bring them to the notice of the inspectors."

TYPHOID FEVER EPIDEMIC AT COLUMBUS, O.

Mr. R. Winthrop Pratt, Engineer of the Ohio State Board of Health, has very kindly furnished us with the following notes of the recent epidemic in Columbus:

In the early part of the present year there occurred at Columbus a typhoid fever epidemic of considerable proportions. Out of the city's population of about 140,000, there were 1606 cases and 162 deaths during the months of January, February and March. The typhoid fever death rate previous to this time had never been as great as that of many other cities. This fact led many of the citizens, including several physicians, to believe that the water supply was quite safe, although sources of pollution were known to exist.

WATER SUPPLY.—Columbus is supplied with water from the following sources: 1st. The Scioto River; 2nd. Filter Gallery on the bank of the Scioto River. 3rd. Alum Creek, and 4th, wells driven along the bank of Alum Creek.

At the "West Side Pumping Station" water is pumped from the first two sources and supplied to the central or business part of the city as well as to the western and northern portions. About 11,000,000 gallons per day are supplied by this pumping station and the proportion drawn from the river direct depends upon the quantity available from the filter gallery. The latter is used when possible but is never able to furnish enough water for any considerable time so that the raw river water is almost always being pumped into the mains in greater or less amount.

Just previous to the epidemic 3,000,000 to 4,000,000 gallons per day, out of the 11,000,000 pumped at the West Side Station, was raw river water.

At the "East Side Pumping Station" water from Alum Creek or from driven wells near by, depending upon the quantity available from the latter, is supplied to the eastern portion of the city. The quantity from this source is perhaps 75 per cent. of that furnished by the West Side Station.

The approximate dividing line betwen the districts supplied by the East Side and the West Side pumping stations is shown on the map.

Distribution of Cases. Almost without exception the typhoid fever cases occurred among the residents of the district supplied with Scioto River water or among the business men, who, though residing outside of this district, were supplied with Scioto River water at their offices. This fact proved that the water supply was the cause of the trouble and also showed that the Scioto River rather than Alum Creek was infected.

Sources of Pollution of the Scioto River. The watershed of the Scioto River above Columbus covers an area of 1070 square miles and consists principally of farm land, although several communities, acting as serious sources of pollution to the river water, are located upon it.

Within 65 miles of Columbus, 27 towns and four institutions exist upon the river or its tributaries, representing a population of about 43,000, while the sewers of six of the towns and three of the institutions discharge directly into the river or its tributaries, representing a population of about 30,000.

Cause. Although there are many places which might have infected the river water with typhoid bacilli, investigation has shown that by far the most probable cause of the epidemic was the State Hospital for Insane, one of the institutions mentioned, located within the city limits of Columbus.

The sewerage system at this hospital is rather unusual. The domestic sewage from the institution, which is occupied by some

1600 people, is collected in an 8-inch or 10-inch cast iron sewer laid within a 36-inch storm water sewer. A short distance away from the institution buildings the sanitary sewer leaves the storm sewer and connects with the city's sewerage system; but the storm sewer discharges into Dry Run, which is a small intermittent stream entering the Scioto River about a mile above the water works intake.

Shortly after the epidemic broke out an inspection showed that connections between the sanitary sewer and laterals, coming from various parts of the institution, were made in at least two cases by simply discharging the laterals into the big storm sewer and constructing a bulkhead immediately below the point of discharge, through which bulkhead the open end of the main sanitary sewer projected. Under these conditions, with every storm, the water collected by the storm sewer carried the accumulated filth from behind these bulkheads into Dry Run and thence to the river. Moreover one of the bulkheads was found to be broken, permitting some of the sewage to flow continuously into Dry Run. It was necessary to take twenty-two and a half tons of putrefying sludge out of the storm water sewer in order to clean it.

. Twelve cases of typhoid fever had occurred at the institution one year previous to the epidemic, since which time there were no reported cases until January 3rd, 1904. The case reported on this date was soon followed by seven more, two of which died.

Typhoid fever had occurred to a greater or less extent at Kenton, the Girls Industrial Home, near Delaware, and at Arlington, all having sewers discharging into the river or its tributaries, and possibly at the Stone Quarries, a small settlement of unsanitary character 3 miles above the intake of the Columbus water works.

There is no doubt that the Insane Hospital discharged the greatest amount of sewage into the river with the exception of the cities of Kenton and Marion. Therefore, considering this as well as the proximity of the institution to the water works

intake (one and one-half miles following Dry Run and the river), the extremely low stage of the river at this time, and the fact that there was typhoid fever at the institution at least ten days previous to the beginning of the rapid increase in the cases in Columbus, it seems fair to conclude that the principal factor in causing the epidemic, if not the sole cause, was the State Hospital.

MONTHLY RECORD OF CASES.

Month.	Cases Reported.	Deaths.	Annual Death Rate per 100,000
December, 1903	40	4	34
January, 1904	725	35	300
February, "	798	94	805
March, "	83	33	283

In April the reported number of cases and deaths were both much decreased.

DAILY RECORD OF CASES.

	Jan.	Feb.	Mar.		Jan.	Feb.	Mar.
1	1	138	9	17	2	19	2
2	0	52	4	18	24	25	2
3	0	29	1	19	48	22	1
4	1	28	4	20	24	27	0
5	8	26	5	21	44	4	4
6	3	48	3	22	35	21	0
7	3	16	7	23	41	8	0
8	7	74	2	24	16	15	0
9	4	34	1	25	43	19	2
10	1	26	3	26	25	14	4
11	5	19	5	27	48	5	0
12	9	15	2	28	35	2	2
13	26	36	1	29	47	4	2
14	34	12	2	30	81	.	2
15	43	36	2	31	23	.	1
16	47	13	4				

APRIL QUARTERLY MEETING

OF THE

Massachusetts Association of Boards of Health.

The quarterly meeting of the Association was held at the Brunswick Hotel, Boylston Street, Thursday, April 28th, 1904, the luncheon beginning at 1 P. M. Dr. H. P. Walcott presided.

THE CHAIRMAN: The Association will come to order. We will listen to the records of the last meeting.

(Records read by the Secretary, Mr. James B. Coffey.)

THE CHAIRMAN: Is there any change to be made in the record as read? If not, it will stand as the record of the last meeting of this Association. The Executive Committee, in accordance with your by-laws, report to the Association, with the recommendation that they be elected, the names of the following gentlemen:

George B. Robbins, Boston.
John A. Morgan, M. D., Hyde Park.
Stephen DeM. Gage, Lawrence.
William C. Doherty, Lowell.
Leonard Huntress, M. D., Lowell.
Joseph S. Hart, M. D., Lincoln.
Martin T. Field, Salem.
Caleb A. Page, Somerville.
Wesley R. Lee, M. D., Somerville.
Edward B. Hodskins, M. D., Springfield.
D. P. Cilley, M. D., Westboro.

THE CHAIRMAN: It is moved that these gentlemen be elected members of this Association. If that be your pleasure, you will signify it by saying aye.

THE CHAIRMAN: These gentlemen are duly elected members of the Association. Is there any incidental business to come be-

fore the Association at this time? If not, we will proceed to the regular programme of the afternoon. The first item is a paper on "Sanitary Dangers of Certain Occupations," by C. E. A. Winslow. I have the pleasure of presenting to the Association Mr. Winslow.

THE SANITARY DANGERS OF CERTAIN OCCUPATIONS.

BY C. E. A. WINSLOW, M. SC.
Mass. Inst. of Technology.

Sanitary authorities exist to protect the citizen against dangers which in his individual capacity he is unable to avoid. First, water supply, milk supply and food supply, must be safeguarded, since the life of every citizen depends upon these necessities. Second, the insidious spread of contagious diseases must be checked, since unrecognized cases of diphtheria or of small-pox menace the safety of all with whom they may come in contact. These two vehicles of disease, infected food and infected persons, threaten every individual in the community and rightly challenge the most ardent efforts of the sanitary engineer and the public hygienist. Of the less general dangers which affect only certain classes of individuals none can, I think, be more important than those connected with trades and occupations. The force of economic necessity too often makes it impossible for the factory operative to escape from the unsanitary conditions which surround him. He is helpless unless the State, or that matured public opinion of which the State is the expression, shall come to his aid. Therefore he has a special claim upon the consideration of such an association as our own.

Thanks to the admirable statistics collected by the Registrar-General of Great Britain, we have a pretty precise idea of the extent to which health may be affected by various trades and occupations. Dr. Tatham's figures, for example, show that the general death rate of Plumbers, Painters and Glaziers, and of Cotton and Linen manufacturers, is nearly twice, that of Potters, Earthenware manufacturers and File-makers is more

than three times, that which obtains in the professional and agricultural classes. Unfortunately American vital statistics, both State and National, are so inaccurate and so incomplete that comparable data for this country are wanting. Such figures as we possess indicate the same startling discrepancies; and Dr. C. F. W. Doehring in the Bulletin of the U. S. Department of Labor for January, 1903, cites statistics for our own State according to which the average life of factory workers in Massachusetts is only 36.3 years against 65.3 for farmers.

The cause of excessive mortality varies widely in different occupations. Most prominent perhaps are those trades liable to accidents in the operation of machinery. English regulations class under four heads the mechanisms which prove most often dangerous, (a) Prime movers, (b) Mill-gearing and belts, (c) Machines for manufacturing purposes, (d) Hoists and other lifting tackle. Mules, looms, circular saws, planing machines and power presses all add their quota of victims. The manufacture of explosives should be placed under this head, with certain electrical processes in which the liberation of charges of high voltage may be the result of careless handling.

Of far greater importance, although less dramatically impressed upon the public mind, are the harmful effects of those occupations in which the worker is subjected to the breathing of excessive quantities of dust. The increase of tuberculosis and other pulmonary disorders due to this cause is unquestionably the gravest feature in the hygiene of occupations. Dust in various trades differs widely in character, but from the fine metallic particles produced in needle-making to the fragments of stone inhaled by quarrymen and the fine fibrous material which fills the air of a carding-room, all in varying degrees produce their bad effects. Dr. Doehring in the paper above cited gives a list of 38 injurious varieties of dust, and in Dr. Thomas Oliver's classic work on "Dangerous Trades," it is shown that in 19 different dusty industries the death rate from tuberculosis and other diseases of the respiratory system is more than twice that of the agricultural class. The rate among agriculturists being

taken as 100, that of Potters and Earthenware manufacture is 453, that of Cutlers 407, that of File-makers 373, that of Glass-makers 335, etc. Less serious but yet appreciable is the danger from metallic dust to Miners, Iron and Steel workers, Gunsmiths and Needle-grinders—from stone dust to Masons, Stonecutters and Cement-makers—from fibrous dust to Shoddy-makers, Rope-makers, Rag-pickers, Cotton and Woolen mill operatives, Carpet-makers, Flax and Hemp carders, and operatives in horsehair factories—from wood dust to Coopers and Carpenters—from flour dust to Millers, Bakers and Confectioners.

Next to dust, excessive temperature and moisture probably contribute most to make certain industries unhealthful. The effect of such conditions upon the general resistance of the organism and particularly upon the vaso-motor system of heat regulation is well understood; and Laundry workers, Glass-blowers, Iron and Steel workers and the operatives in wet spinning rooms pay a heavy tribute of deaths from tuberculosis and other pulmonary disorders in which these form a predisposing cause.

Another important series of industrial disorders are the intoxications due to the introduction into the system of certain metallic poisons. Plumbism is the familiar example of this class. If deaths from lead poisoning among all occupied males be taken as one, the comparative mortality in England is, among Lead workers, 211; among File-makers, 75; among Plumbers, 21; among Painters and Glaziers, 18; among Potters, 17; among Glass-makers, 12, while Copper-workers, Coach-makers, Gasfitters, Locksmiths, Calico printers, Enamellers, Solderers, Type founders and others suffer to a lesser degree. Mercury poisoning occurs among the makers of thermometers and other physical instruments, the makers of incandescent electric light bulbs and other electrical supplies, and in certain more restricted industries. Cases of arsenical poisoning, though becoming yearly more and more rare, are not entirely abolished. Copper and zinc poisoning are not unknown; and chromium sometimes af-

fects workmen in bichromate works and those who use dyes containing this metal.

Still another group of diseases are caused by the fumes of various non-metallic chemical substances. Carbon bisulphide as used in certain processes for treating india rubber and gutta-percha produces severe hysteria and exhaustion. Strong acids and alkalies sometimes overcome the workmen engaged in their manufacture. Benzine, as used in cleansing, and certain other commercial spirits, more rarely cause toxic effects. Here, too, we may mention the manufacture of fertilizer, rendering, bone-boiling, tanning and other industries accompanied by the production of noxious odors of decomposition which slowly undermine the general vitality.

Finally, as a last class of occupation diseases, there are certain bacterial maladies which under unusual conditions may be transmitted by trade materials. Cases of typhoid infection among laundry workers are so common as to warrant their inclusion under this head. Anthrax affecting wool-sorters and the handlers of hides is a typical case in point; and those vocations which bring men much in contact with the lower animals lead, though rarely, to infection with glanders, foot-and-mouth disease and other disorders.

In looking over this list of the dangers to operatives from accident, from dust, from heat and humidity, from metallic poisons, from noxious fumes and from infectious diseases, it seems obvious that most of them are preventable and thus legitimately within the field of sanitary science. The fencing of machinery, with proper regulations as to its operation—the removal of dust by special ventilation and the substitution of processes in which no excessive amount of it is formed—the regulation of humidity and temperature, the government of lead and other chemical factories by such rules as shall prevent the ingestion of poisonous substances, are all practical preventive measures. The problems, however, are various and complex, and each industry requires detailed study and specific treatment. So in England, the country which first took the lead in factory leg-

islation, we find a maze of statutes under the general heading of Mines and Factory Acts, which have gradually grown up year by year to meet the exigencies of individual cases. Beginning in 1802 with an act for preserving the "health and morals" of apprentices in cotton mills, various statutes provided for general sanitary conditions, and in 1883 a bill for the government of white lead works recognized the principle of special regulations for particular trades, a principle extended by the Act of 1891, so that such rules can be drawn up by the Factory Inspectorate for any industry certified as dangerous by the Secretary of State. A similar development has taken place in Germany, where factories must receive authorization dependent on compliance with elaborate rules as to general ventilation, removal of dust and fumes, temperature, lighting, proper rooms for meals, lavatories and cloak rooms, water-supply, protection from accidents, and exclusion of women and children from dangerous and exhausting processes. The special trades for which regulations have been drawn up in England and Germany are shown in the appended table, taken from Oliver.

INDUSTRIES FOR WHICH SPECIAL RULES HAVE BEEN ENACTED.

ENGLAND.

1 Bichromate works
2 Bottling of aerated water
3 Brass and alloy mixing and casting
4 Bricks, glazing of, by lead
5 Chemical works
6 Earthenware and china
7 Enameling of iron plates
8 Electric accumulator works
9 Explosive works in which dinitrobenzole is used
10 Flax spinning and weaving
11 Lead (red and orange) works
12 Lead (white) works
13 Lead (yellow) works
14 Lead smelting works
15 Lead, yellow chromate of
16 Lucifer match factories
17 Paint and color works, and extraction of arsenic
18 Skins and hides, sorting
19 Tinning and enameling of metal ware
20 Tinning and enameling of iron hollow ware
21 Transfers (lithographic) for decoration of china, etc.
22 Vulcanizing of india rubber
23 Wool sorting
24 Wool combing

GERMANY.

1 Basic slag works
2 Bichromate works
3 Brick works
4 Brushmaking works and horsehair spinning
5 Cigar factories
6 Chicory works
7 Electric accumulator works
8 Glassworks
9 Hackling and preparing rooms in tex tile factories
10 Lead, color and acetate of lead works
11 Letterpress printing works
12 Lucifer match works
13 Sugar refineries
14 Vulcanizing of india rubber
15 Wire-drawing mills

Less elaborate systems of factory legislation are in force in France, Austria, Belgium, Holland, Sweden, Switzerland and other European countries. It is, however, significant to note that the two nations which have advanced farthest along this path are the two leading commercial powers of the Old World, and that one of them at least owes its ever increasing pre-eminence to the general application of the broad scientific principles of economy of force upon which such legislation is founded.

Turning to the United States we find the regulation of dangerous trades in a primitive and undeveloped state. We lack even statistical information as to the extent of occupation diseases; we wholly lack scientific study of existing factory conditions. In our State of Massachusetts there is indeed a Department of Inspection of Factories and Public Buildings under the Chief of the District Police, but the officials of this department, however able and efficient, cannot properly solve such complex problems as those of factory sanitation without special expert assistance. Chapters 104 and 106 of the Revised Laws, under which for the most part they work, contain several admirable general principles. It is provided, for example, in Section 51, Chapter 106, that "a factory in which five or more persons are employed shall, while work is carried on, be so ventilated that the air shall not become so impure as to be injurious to the health of the persons employed therein, and so that all gases, vapors, dust or other impurities injurious to health, which are generated in the course of the manufacturing process or handicraft carried on therein shall, so far as practicable, be rendered harmless." This is good so far as it goes. It does not apply, however, to small factories or to workshops where men only are employed. It gives no power to deal with such special evils as lead or arsenic poisoning. Even with respect to ventilation general provisions are useless unless applied in the form of such detailed and specific regulations as can be drawn up only by expert sanitary authorities.

The backwardness of factory legislation in this country is no doubt in part due to the fact that we have never had the gross

evils which elsewhere become so patent as to demand drastic measures for their redress. Evils exist, however, and though less obvious than those which caused Sir John Simon to speak of "the canker of industrial disease" gnawing at the root of England's national strength, it is high time that we gave them some attention. From the figures in the Census of 1900 I find that there were 127,000 persons in Massachusetts engaged in trades shown by investigation in other countries to be more or less prejudicial to health, including 38,642 foundry and machine shop workers, 26,211 house and sign painters, 17,696 brick and stone masons, and 8112 plumbers and gas and steam fitters. In the more intensely dangerous trades we find 2395 cutlers, 289 emery wheel workers, 89 file makers, 264 grinders of kaolin and other earths, 270 operatives in needle and pin factories, 758 persons engaged in the making of pottery, terra cotta and fire-clay products, and 449 workers in shoddy mills. Judging from analogy it seems probable that the unregulated conduct of these industries and certain others is causing a constant drain upon the health of the community; and in spite of the absence of good vital statistics or scientific factory inspection specific instances every now and then attract our notice. The spread of the disease, Anthrax, in Lynn from a morocco worker who had handled infected hides, was noted in the newspapers only a few weeks ago. The death rate from consumption in Massachusetts according to the United States Census of 1900 was 2.5 among all males, 3.7 among marble and stone cutters and 4.1 among masons; and Dr. T. J. Dion of the Quincy Board of Health writes me that the excessive prevalence of tuberculosis among the stone cutters in that city is a well known fact. In Chester is a factory of which Dr. C. J. Shepardson, a leading local physician, says, "We have a mill in town where quartz or silex is reduced to sandpaper, etc., which has been responsible for a great many deaths. Not much work is done there, however, and I think the force of employees is kept so low that the law as it now exists is not applicable to the place."

At East Douglas is an axe factory, in relation to which Dr.

Titus P. Holbrook allows me to quote the following statement: "I have been in practice in East Douglas since 1863 with the exception of some thirteen years following 1872. I have seen quite a number of cases of so-called grinders' consumption. I have examined one case post mortem. I found the smaller bronchial tubes thoroughly filled with the grindstone grit; the lung in the lower part looked like and felt like the liver after cooking. The symptoms are excessive dyspnœa on slight exertion, dry cough and great prostration. The grinders are from the Polanders and Finns for the past dozen years. The disease takes hold of them more frequently, and is more rapidly fatal than among the grinders of former years and of other nationalities. When I came here 40 years ago I found the victims among the Yankees who had ground some 20 years before. Those would grind 18 or 20 years before having to give up work. The French Canadians were then grinding. They could work 12 to 16 years. They became frightened off, and the Swedes took up the work. They would get the disease in 8 or 10 years. Now the Finns and Polanders are at it, and they last only 3 to 5 years, and the disease is more common among them."

It is not surprising to find on an examination of Massachusetts Registration Reports that while the death rate from consumption for the period 1881-99 was 2.5 for the whole State, it was 3.4 for the town of Douglas.

Nearer home I visited within a month a twine mill not five miles from where we are gathered at this moment. I wish I could take you through that factory and show you the dry spinning room with its clear normal air, the carding room filled with clouds of fine choking dust and the wet spinning room with the hot damp deadly atmosphere of a tropical forest. In the first department you would see average healthy factory workers alert and cheerful; in the last two, the women and children, some of them palpably under age, with dull eyes and feverish cheeks, stand or sit listlessly by their machines, stolidly going through the mechanical routine which brings them daily nearer to the inevitable end. The factory inspector had made his visit a few

days before mine; but being neither a medical man familiar with the symptoms of tuberculosis, nor a sanitary engineer, versed in the laws of ventilation, he found no fault except to suggest that the few insufficient ventilating fans which had been installed should be put in operation. When I went through the factory some of them were running and some were not; and as the superintendent told me of the admirable quality of twine he was turning out I could not but feel that the cost as paid in human lives was far too high.

These are isolated cases only. Granted. Yet I believe that in the discussion this afternoon the members of this Association may add many more from their own experience. We have already enough in my judgment to warrant us at least in looking further. We need exact knowledge of conditions here in Massachusetts. We want the State census of 1905 so planned as to furnish statistics of occupation mortality which shall be full and accurate. We want the Legislature to appropriate money for a special investigation of the risks and dangers of factory life by the State Board of Health, which, having solved the fundamental problems of water supply and sewage disposal, should be our pioneer in these new fields. With the facts once in hand, the members of this Association will not be slow to apply the needful remedies. It is the pride of sanitary science that it is founded on the unchanging rock of Nature's laws. Yet we study the world as it is only to make it better; and I believe that the informing motive of our profession, whether we are conscious of it or not, is a deep-rooted enthusiasm for the progress of that humanity which in such diverse individuals is so mysteriously one. These twin impulses, the love of truth and the love of man, are together irresistible, both should impel us to remove the cruel conditions which make it necessary for even one individual to barter the health of tomorrow for the livelihood of today.

THE CHAIRMAN: Mr. Winslow's very interesting paper is before you for discussion. I hope it may give rise to questions and to additional information.

DR. BECKWITH: I would like to ask if the reader of the paper or any one else knows whether people working in celluloid factories have their health impaired. I have seen two or three cases in which there has been a great loss of strength and weight, and also some impairment of the kidney function. In fact, I have found two or three cases where there was a good deal of albumen in the urine, and it has seemed to me as though there was something in the process of making celluloid that perhaps caused this.

THE CHAIRMAN: Have you come across that, Mr. Winslow?

MR. WINSLOW: I have not.

THE CHAIRMAN: Dr. Abbott, I think you might say something to the point.

DR. ABBOTT: The reader of the paper has covered the ground so fully that I have but little to add to what he has said, except to amplify one or two points. I will answer the last speaker, in regard to celluloid, that I visited a celluloid factory in the village of Zylonite, part of the town of Adams, some years ago—I think it is not in existence now—and went through the whole factory, noting the different processes. It seemed to me that the principal danger there, aside from the tremendous danger of fire, was that of breathing the spirits of camphor. I understood the superintendent of the factory to say that occasional cases of headache and some irritation of the throat were about all that really were to be feared. The fact is, as the reader said, we do very little about this subject in this country in consequence of the want of information upon the subject. Any sanitary body has to have, of course, information first, and then it can go ahead with prevention afterwards. The information is almost all foreign. The laws in Massachusetts put this whole work in charge of the district police, but the district police—perhaps through want of funds—have not, as they have in other countries, any efficient and intelligent medical authority under their control to supervise the work; so that the laws which have

been framed at their instance have been mostly laws in regard to ventilation, plumbing, etc., which, of course, are important, but there is not much of anything upon other points. The general term "sanitary" appears in those laws, but that term needs to be more specifically defined, in order to amount to anything. The occupations which the reader has spoken of as most dangerous to health are those which have to do with the metallic poisons, lead, arsenic and corrosive sublimate, also the poison of phosphorus which is involved in the trade of match making, and the dust producing occupations. Then another occupation which is a source of danger is that of persons who are exposed to alcoholic excess—that is, bartenders and saloon-keepers. Every life insurance man knows very well that a bartender or saloon-keeper will not be taken as a risk except under restricted limitations.

Some years ago I visited a paper mill in Maine, where I was surprised to see that the people were far better protected than in any mill I have ever seen in this State. That was Mr. Warren's mill, the Cumberland Mill.

THE CHAIRMAN: He was a Massachusetts man.

DR. ABBOTT: Yes, sir. The fact is, in the paper mills there are two classes of people, one class which is exposed to danger and one class which is not. The first class comprises persons who take the rags and dust them. The dusting men, perhaps, first of all, and then the women who sort the rags in the mill, are constantly exposed to danger from dust. Also, as Dr. Withington found in an inquiry made for our board some fifteen years ago, there is the exposure to small-pox, which is not so great as it used to be since greater precautions are taken in paper mills with reference to the vaccination of employees.

In the sorting room of Mr. Warren's mill where the women sort the rags, every person has in front of her a machine, or a part of a ventilating apparatus, which is connected with a general shaft running through the room by which all the dust is taken away from the mouths and faces of the operators and de-

posited in a shaft outside the building. The other class in the paper mills that handle the finished paper after it has been through the various processes are not exposed to any danger whatever. The clean paper has been thoroughly disinfected by the processes to which the rags have been subjected.

With regard to arsenic, I can say this. I visited some ten years ago a mill in this State where 200 pounds of paris green were then made annually. The complaint then had nothing to do with the operatives, but it came from the people outside who were afraid of the arsenic being distributed around the surrounding region for a quarter of a mile. One farmer allowed his whole crop of hay to rot on the ground for fear his cows would be poisoned by eating it. But the condition of the operatives in that mill surprised me. Almost every man in that establishment had sores upon the face, eyes, nose, ears, mouth, hands and other parts of the body, due to the neglect of the greatest of all laws, the law of cleanliness—absolute cleanliness—which has more to do with this subject than anything else. People handle these metallic poisons and then take their lunch without washing—that is where the trouble very largely comes from, handling poisons and then contributing those poisons to the food every day, right along, day after day. I have seen the same thing in other factories of similar nature.

The figures, it has been said, are unreliable in this country. There are no figures in this country upon this subject that really amount to anything except, perhaps, those of some of the great industrial insurance companies. One reason for this unreliability is this. In this State the statistics on this subject were begun in 1842, and were continued for nearly forty years. They were published in the registration reports for all that time, but they gave the average age at death, which does not amount to anything. It has no significance whatever upon the subject. Let me illustrate. A major general dies at seventy years of age, we will say, as a general rule, and a lieutenant dies at perhaps thirty or forty years of age. Is that of any value to show that the position of a major general is any more healthful than that

of a lieutenant? Not one bit. It is a question of age. In an old ladies' home the average age at death is seventy; in an infants' asylum it is two. Is one for this reason to be considered any more healthful than the other? Not a bit. These figures were on a wrong basis. When we can get down to the proper basis of comparing the deaths in each industry at certain ages with the living at similar ages we shall have something to rely upon.

PROF. SEDGWICK: In view of the paper which has been read and the fact that members of this Association are stationed as sanitary pickets, as it were, all over the State, I hope that any one within whose knowledge there may come information regarding cases of damage to health due to special occupations will be kind enough to communicate with Mr. Winslow and inform him of the fact. And in view of the statements which have been made by the secretary of the State Board of Health that we lack authentic information even in this State, which is noted for its leadership in sanitary science, I would like to suggest the passage of a resolution requesting the Legislature to set in motion some machinery looking toward the gathering of accurate information. It so happens that this is a very good time to do this, inasmuch as there is a committee of the Legislature now considering just such questions, namely, the Committee on Relations of Employers to Employees. With this idea in mind I am going to submit for your consideration, and if possible for your adoption, the following resolutions which, if they should come with the authority of this Association, might, I believe, do a real good at the present juncture in bringing about legislation looking towards the end desired. I should like to move, Mr. President, that this Association adopt, and through its secretary forward to the proper persons, the following resolutions:

"Whereas, investigations in other countries have shown that certain trades and industries, when conducted without due sanitary supervision and regulation, are injurious to the health of the operatives employed; and

"Whereas, exact information is lacking with regard to the extent of such evils, if any, in Massachusetts, be it

"Resolved, That the Massachusetts Association of Boards of Health, in Boston assembled, April 28, 1904, respectfully urge the General Court to direct the State Board of Health, with such aid as it may require from the chief of the District Police and the Bureau of Statistics of Labor, to investigate and report upon the sanitary conditions of factories, workshops and other places of employment in the Commonwealth of Massachusetts, with respect to all conditions which may endanger the life and limbs or be prejudicial to the health of persons employed therein."

THE CHAIRMAN: You have heard the resolution introduced by Prof. Sedgwick. What is the pleasure of the Association with regard to them?

DR. SMITH: It seems to me better that this Association should not undertake to get information concerning the dangers to life and limb of employees. It seems to me we have got enough to do to give our attention to unsanitary conditions and to those conditions which lead to certain diseases, and I would move an amendment, that that particular phrase be stricken out.

PROF. SEDGWICK: I am willing to accept that amendment, Mr. President.

THE CHAIRMAN: Do I understand that it is the pleasure of the mover of the resolution to so amend it that it shall read, "all conditions which may endanger the life or be prejudicial to the health of persons employed therein?"

PROF. SEDGWICK: I think Dr. Smith wished to omit "life and limb" both.

THE CHAIRMAN: "With respect to all conditions which may be prejudicial to the health of persons employed therein." I understand that is the form you are now willing to leave it?

PROF. SEDGWICK: Yes.

THE CHAIRMAN: The essential part of the resolutions then will now read, "to investigate and report upon the sanitary conditions of factories, workshops and other places of employment in the Commonwealth of Massachusetts with respect to all conditions which may be prejudicial to the health of persons employed therein." It is moved and seconded that these resolutions be adopted.

DR. MILLER: I was going to suggest that we leave in that word "life." I think it is important to have it in there—"life and health."

DR. SMITH: I simply made the suggestion to narrow down the inquiry to matters of sanitation. If the Association intends to go into the question of accidents it seems to me that is somewhat beyond our scope. It belongs to an entirely different body —to a body of engineers—to determine the conditions that endanger the limbs of persons, and not an association of this kind. The two functions, it seems to me, are quite distinct. While I think that we should certainly support these resolutions, as being of very great importance, it seems to me that what I suggest is much simpler than the broader statement that is contained in the original draft. All conditions that militate against the health of individuals may in the long run affect life of individuals. It seems to me the two terms, health and life, are more or less synonymous.

THE CHAIRMAN: What is your pleasure with regard to these resolutions? It is moved that they be adopted. If that be your pleasure you will signify it by saying aye.

(The motion was carried.)

THE CHAIRMAN: It seems to be the unanimous sense of this Association. The next paper upon our programme is by Dr. S. J. Russell, city physician of Springfield, on "Trichinosis."

(EDITOR'S NOTE.—Dr. Russell's paper, describing certain cases of Trichinosis, was read, but was not submitted for publication in time for use in this issue.)

THE CHAIRMAN: Dr. Russell's paper is before you for discussion.

DR. CHAPIN: I should like to ask one or two questions. Was this animal fed on offal?

DR. RUSSELL: It was fed on offal from the city of Springfield.

DR. CHAPIN: Then I want to know whether all the pork was from one animal, and also how the pork was cooked that caused the trichinosis.

DR. RUSSELL: On the first examination I questioned the patients about the pork. They said they had eaten very little, and it was well cooked. I forgot to state that the blood examinations, made in every case, showed an increase of eosinophiles, ranging from sixteen to sixty per cent.

DR. CHAPIN: Did you find on further investigation that the pork they had eaten was cooked a long time in the ordinary manner, like roast pork or friend ham or boiled ham—just how was it cooked?

DR. RUSSELL: I found that some of the pork was in the form of sausages which were eaten raw, but they claimed that most of the pork was very well cooked. Some ate raw pork and others ate the sausages raw.

DR. CHAPIN: Was it your opinion that some of them ate only the well cooked pork, or do you think all of those that were affected ate pork which was practically raw?

DR. RUSSELL: I think most of the pork was under-done.

DR. CHAPIN: Was there more than one animal infected?

DR. RUSSELL: Just one.

DR. CHAPIN: Did any other people eat of that who were not taken sick?

DR. RUSSELL: There were a few who ate a very little of it and were not taken sick.

Dr. Smith: This disease, while it seems to be comparatively rare in our own country, is yet more prevalent than is generally supposed. It is probable that mild cases occur, which are diagnosed as something other than trichinosis, and the true facts in the case are not discovered unless the body of the person should reach the dissecting room, and there the trichinosis may be found. Dr. Williams of Buffalo has made a rather careful study of the prevalence of trichinosis in our country, and he found that not less than five per cent. of the bodies that were examined contained trichinæ. This would indicate that the infection is commoner than we suppose, but that the dose is also less than that which people consume who eat meat raw. In Europe, as probably most of you remember, the outbreaks were at one time very extensive. The manner of the meat distribution there is so different from that which subsists in this country that outbreaks are traced more easily to their source. In the smaller towns and villages the animals that are slaughtered are consumed on the spot, so that a single pig may reach a large number of consumers, and epidemics in which hundreds of people have been involved, and in which the mortality has been relatively very high have been traced to single pigs. With reference to the cooking of meat, it is probable that now and then large masses of meat, although apparently well cooked on the surface, still retain living trichinæ near the bones. A few years ago my attention was called to some cases of trichinosis in one of our charitable institutions in the State. So far as was known at that time, the meat was thoroughly cooked. All precautions were being taken, and yet unquestioned cases of trichinosis occurred in this institution. The hogs were examined by removing small bits of tissue with a harpoon, and I think in over half of the cases trichinæ were found. Hence it may occur that infection with trichinæ will take place in families where pork is usually very well prepared, but where certain portions of it have not been subjected to the heat necessary to kill the trichinæ, where in other words the pork is underdone. This may account for the five per cent. of cases which have been found in the dissecting room and at autopsies by Dr. Williams. Of course the remedy is in all

cases to thoroughly cook the pork. In fact, that is probably the the only remedy, unless the industry of raising hogs should be completely changed, and that of course would greatly augment the price of this kind of meat. Trichinosis in this country was practically unknown until the habit of certain foreigners of eating meat underdone or raw was brought with them. In France the disease is practically unknown, because the people cook all their meat, though, so far as we know, the statistics of the examination of pork show that the pigs in France are no less infected than in other countries. Practically the only remedy we have is to instruct the people to cook the meat as thoroughly as possible.

THE CHAIRMAN: If there is nothing else to be said upon this subject, we will proceed to the next paper on the programme, "The Transmission of Infection by means of Footwear," by Dr. Francis P. Denny and Mr. J. Albert C. Nyhen of Brookline.

THE TRANSMISSION OF INFECTION BY MEANS OF FOOTWEAR.

BY DR. FRANCIS P. DENNY AND MR. J. ALBERT C. NYHEN
Brookline Board of Health Laboratory.

The experiments which are here reported were carried out by the writers in the Brookline Board of Health Laboratory, with the object of determining in a general way how readily infectious material will adhere to shoes, and how long and how far it will be carried in that way.

These experiments, which have been of a very simple nature, have consisted chiefly in putting some growth of the Bacillus prodigiosus (a red-pigment-producing non-pathogenic organism) on various parts of our shoes before going out from the laboratory to attend to our regular duties. On returning to the laboratory after varying intervals of time, each part of the shoe which had been infected was thoroughly rubbed with a moist cotton swab, and then the swab was rinsed in a tube of melted gelatine, which was then plated. The bacilli, if recovered from the shoes, appeared in the plates as characteristic red liquefying colonies.

The parts of the shoes which were inoculated were the under surface of the sole and heel, the lower edge of the side of the sole, the instep, and a few tests were made by inoculating some of the small holes in the O'Sullivan rubber heels. When entering the laboratory on our return, care was taken to avoid having the parts of the shoe which we had inoculated come in contact with the floor, which might have become infected with B. prodigiosus from some of the earlier experiments. In a number of control plates made from the parts of the shoes which had not been inoculated, B. prodigiosus was never found.

The tests were made during all the different seasons and under very varying conditions of weather and temperature. The amount of walking that was done while the bacilli were on the shoes varied considerably, but was usually more than that of the average physician for the same length of time.

The total number of tests made was 126. The results are given in the following table:

Duration of Tests.	Number of Tests Made.											
	Sole		Heel		Instep		Side Sole		Rubber Heels		Rubber O'rshoes	
	+	—	+	—	+	—	+	—	+	—	+	—
½ hour	1	1	1	.	.	.	.	.	.	.	.	.
1 "	5	13	5	7	.	1	2	.	.	.	2	2
1½ "	4	5	4	1	1	1	.	.	.	.	.	.
2 "	3	3	2	1	.	1	1	.	.	.	.	.
3 "	1	3	1	1	3	1	.	.	.	.	.	6
4 "	.	.	.	.	3	.	4	.	.	2	.	.
5 "	.	.	.	.	1		.	.	.	.	.	.
6–8 hours	.	2	.	.	.	2	.	.	.	.	.	.
8 to 12 "	.	2	.	1	2	.	2	.	4	1	.	.
24 "	.	1	.	.	2	1	2	1	.	.	.	.
48 "	.	.	.	.	1	1	.	1	.	.	.	.
72 "	.	.	.	.	1	1	.	2	.	.	.	.
5 days	.	.	.	.	.	1	.	.	.	.	.	.
8 "	.	.	.	.	1	.	.	.	.	.	.	.
9 "	.	.	.	.	.	1	.	.	.	.	.	.
	14	30	13	11	15	11	11	4	4	3	2	8

Some of these data may be summarized as follows:

In thirty-seven tests where the *soles* were inoculated and where plates were made after intervals varying from one to three hours, the bacilli were found in thirteen (35 per cent.)

In twenty-two tests with the bacilli on the *heels* for a similar length of time, the plates were positive in twelve (55 per cent.) This would seem to show that bacteria will remain longer on the heel than on the sole, although the number of tests made is rather small to justify that conclusion.

In twenty-six tests where the *instep* was inoculated and plates were made after intervals varying from one hour to nine days, the results were positive in fifteen (58 per cent.)

In fifteen tests with the bacilli on the lower edge of the *side of the sole,* eleven were positive after intervals varying from one to seventy-two hours (73 per cent.)

As was to be expected, we found that the bacilli remained on the side of the sole and the instep for a much longer time than on the sole or heel. In ordinary walking on the sidewalks there is very little friction on the instep and the side of the sole. In some of the tests we could actually see for several days the growth which we had put on the instep. On the contrary, cross-country walking will very quickly remove any material from the instep or the side of the sole.

In seven tests where the *holes in the rubber heels* were inoculated, four were positive after intervals of four to nine hours.

Ten tests were made with the bacilli on the soles and the heels of *rubber overshoes* which were worn when there was snow on the ground. Of four tests with a one hour interval, two were positive and two negative. Of six with a three hour interval, all were negative.

With the exceptions about to be mentioned, the bacilli used in these tests were from fresh blood serum cultures. Eight of the tests were made using bacilli, which had been dried and pulverized. The powdered bacilli were put on a sheet of paper on the floor, and the foot was pressed over them. Six of the eight tests were positive after intervals of one to one and one-half hours.

Six tests were made using mucus, in which some growth of B. prodigiosus had been mixed; three were positive and three negative.

It seems probable that the bacilli actually persisted on the shoes in a much larger proportion of cases than would appear from our results, for many conditions were present to prevent all the bacilli appearing in the plates. Thus, all the bacilli were not necessarily removed from the shoe by the cotton swab, and probably all the bacilli removed on the swab were not washed out by the melted gelatine. Furthermore, some of the bacilli were doubtless overgrown by other bacteria, especially by some very abundant forms which rapidly liquefied gelatine.

These experiments having shown that footwear experimentally infected with bacilli will carry the infection to a distance, it remains to consider: (1.) under what conditions are shoes likely to become infected; (2.) what is the danger of the transmission of disease by the feet; (3.) what precautions should be taken to prevent the transmission of disease in this way.

INFECTION OF THE FEET IN THE VICINITY OF CASES OF CONTAGIOUS DISEASE.

It is certain that the floor of a room occupied by a contagious case becomes infected. Flugge* and others have shown that fine bits of secretion are given off as a spray in the act of coughing, sneezing and loud talking. These droplets disperse themselves to varying distances from the patient, and then sink onto the floor and other surfaces. Fine particles of epidermis from persons desquamating also find their way to the floor. In unmodified smallpox some of the many thousand scabs given off from each patient during desquamation are sure to drop on the floor despite the watchfulness of the attendants. If one looks carefully, one can actually see these scabs on the floor about the bed of a smallpox patient who is at the height of desquamation. What is true of such gross particles will be equally true of the smaller particles of epidermis in scarlet fever and others of the exanthemata.

*Deutsch. med. Wochen. Oct. 14, 1897, p. 665.

From the results of our experiments, it is certain that a person walking over an infected floor may carry off some of the infectious material on his shoes. One of the writers found a scab clinging to the foot of a patient in a small-pox hospital, and also on the sole of a rubber overshoe, which he himself was wearing in visiting the hospital. Wright and Emerson* found diphtheria bacilli on the soles of the shoes of three nurses in the diphtheria ward of the Boston City Hospital.

It is often possible for a physician to visit a contagious case without coming in contact with any infected objects, except with his hands in examining the patient, and with the soles of the shoes on the floor. The hands are always disinfected on leaving the patient, but the feet are usually neglected.

Is it necessary or desirable that precautions should be taken by physicians and others visiting a contagious case, to guard against carrying away infection on the feet? In many instances we believe it is unnecessary, for the reason that while it is possible for pathogenic organisms to be carried from the room on the feet, there is comparatively small chance for the infection to pass from the floors to which it has been carried to the mucous membranes of susceptible persons.

Under the following conditions it seems to us important that precautions should be taken:

(1.) *In the more serious contagious diseases,* and those which from the point of view of the public health are especially important; for example, small-pox, plague and foot-and-mouth disease.

(2.) *Under any circumstances, where it is considered necessary to have a strict quarantine;* for example, if it is considered necessary to keep a sheet wet with a disinfectant at the door of the patient's room, then certainly care should be taken to prevent infection being carried out on the feet of those leaving the room.

(3.) In scarlet fever and diphtheria, where a physician or other person is going very directly from a contagious case to rooms or nurseries where there are small children who play on the floor.

*Centralblatt fuer Bakteriologie, 1894. XVI. p. 112.

(4.) *In contagious hospitals.* In a hospital where a large number of contagious cases are collected together, the floors must be very thoroughly infected, and if persons are passing back and forth from one part of the hospital to another, for example, from the scarlet fever to the diphtheria side, without taking any precautions with their feet, there is great opportunity for the transmission of the contagion. It is not necessary that persons should actually pass from one side of the hospital to another, in order to have the infection transmitted by the feet. This may take place if the attendants from different sides use any rooms or corridors in common. In some contagious hospitals, which are considered models of their kind, the nurses from different departments use dining rooms and other rooms in common. It seems to us very important that in the construction of a contagious hospital provision should be made for the complete separation of the nurses caring for the different diseases.

PRECAUTIONS TO GUARD AGAINST CARRYING INFECTION ON THE FEET FROM ROOMS OCCUPIED BY CONTAGIOUS CASES.

On leaving the room the soles of the shoes may be immersed in a disinfectant, or the sole may be thoroughly wiped with a towel or cloth wet with a disinfectant. Rubber overshoes afford a very convenient and satisfactory method of protecting the shoes from infection as they may be put on before entering the sick room or hospital and taken off on leaving. They are easily disinfected themselves by immersion in a disinfectant solution. The nurse who is taking care of a patient isolated at home may put on rubber overshoes in passing through the house on going out for her daily exercise.

INFECTION OF FOOTWEAR FROM SPUTUM.

The habit of spitting on the sidewalk and floors of public places is still very common. On almost every sidewalk which is much used one can see sputum at intervals of only a few yards. Mucus adheres readily to the sole of the shoe, and if a person

steps on fresh sputum it may cling to the edge of the sole or low instep, and so be carried for a long time. It is not necessary here to speak of the dangers from sputum. It is well to remember that besides tubercle bacilli, other pathogenic bacteria may be present, for example, the influenza bacilli, pneumococci, and the diphtheria bacilli.

It is certain that any bacteria which are on the sidewalks may be carried to the floors of our own houses. In this way persons of refinement are exposed to disease through the filthy habits of others. To protect the public, therefore, spitting on the sidewalk should be an offence punishable by law, and this law should be enforced. It is our belief that footwear plays an important part in the dissemination of the tubercle bacillus.

INFECTION OF THE FEET FROM FECAL MATTER AND URINE.

Shoes may become contaminated in fields and gardens with fecal matter used as fertilizer and also in alleys and other more or less secluded places. Fecal matter is very likely to become adherent to the instep where it will be carried for a long time. The chief danger of fecal contamination is from typhoid bacilli.

The work of Richardson* and others has shown that typhoid bacilli in large numbers are often present in the urine in typhoid fever, and that they persist for a long time—months and sometimes years after recovery. Persons urinate out of doors much more frequently than they defecate and often in places where persons walk. The soles of the shoes may become contaminated with urine, and especially with soil saturated with urine.

If typhoid bacilli are brought into houses in material on the shoes, they may then be carried to articles of food by means of flies.

In military camps the feet probably play an important part in the spread of typhoid fever. If from lack of discipline or the indifference of the commanding officers, the men do not always use the sinks, the excreta (urine and feces) may become thoroughly disseminated in the camp by the soldiers' feet.

*Journal of Experimental Medicine. Vol. iii. No. 3. 1898.

The report of the committee* appointed to investigate the prevalence of typhoid fever in the camps during the Spanish War calls attention to this means of spreading the disease. The conditions of camp life, and especially the exposure of food to flies, are very favorable for the transmission of typhoid in this way.

FOOTWEAR IN THE TRANSMISSION OF ANIMAL DISEASES.

Feet probably play an important part in the transmission of animal diseases. The floors of barns and stables are sure to become contaminated with excreta, which is carried about on the shoes of the men and on the feet of the animals. If pathogenic organisms are in the excreta or on the floor, the animals' fodder is likely to become contaminated, as hay and ensilage are often walked over and tossed about on the floors.

Veterinarians and other visiting barns infected with foot-and-mouth disease should take special precautions to avoid carrying the infection on their shoes to other herds.

The point which we wish to emphasize most is the importance of footwear in disseminating tubercle bacilli. There is a great deal of sputum on our sidewalks, much of it is tubercular. We are carrying it about on our shoes and into our homes. The prevention of spitting on surfaces where people walk should receive the attention of all who are engaged in public health work.

THE CHAIRMAN: Before proceeding to the discussion of this paper I should like to call the attention of the Association to the fact that at the time of our annual summer outing with the authorities of the city of Boston in Boston Harbor—I may say one of the most agreeable occasions of the year—the laboratory of the State Board of Health for the preparation of vaccine matter and anti-toxin will be in operation. The building is externally complete, and will be occupied probably in June, so that in July we shall be able to show the members of the Association the establishment in actual operation. The building is at Forest Hills,

*Vaughan; Boston Medical and Surgical Journal. May 18, 1899. p. 480.

within 10 minutes of the South Station by the quick trains of the New York, New Haven & Hartford Railroad, and the building at Forest Hills is a distance of only two or three minutes walk from the railroad station. It would be very possible for the members of the Association, as they come to Boston, to spend an hour or two in the inspection of that establishment before taking the steamer for the island in Boston Harbor, and I hope the members of the Association will take advantage of the opportunity offered. The paper of Dr. Denny is now before you for discussion or question.

DR. HARRINGTON: Dr. Denny's very interesting results suggest to me the desirability of the extension of such an investigation so as to determine how much danger of carrying infection may reside in women's skirts, through the senseless custom of dragging them over dusty sidewalks and staircases, gathering up all manner of filth which must necessarily be carried into the household. I know that it is a common practice on getting home to shake the skirt, in order to detach as much as possible of the dirt that has adhered during the walk. I hope that Dr. Denny will look into this matter, for it seems to me that there may be even greater danger of transmission of infection by skirts than by footwear. Another suggestion occurs to me. In place of putting on rubbers in passing to and from a contagious case, why would it not be well to use some sort of sandal made of stout paper, which, after use, could be burned? When one wears rubbers they must afterwards be disinfected, whereas with a very cheap sort of paper sandal the necessity of disinfection would be done away with.

DR. CHASE: I would like to say a word about the practical carrying out of these suggestions of Dr. Denny as to shoes. At the Brookline Board of Health Hospital we have two or three pairs of rubbers in the robing room at the entrance of the diphtheria ward, and also of the scarlet fever ward, and I find it a very easy matter to slip on one of these pairs of rubbers; and if another physician is along he does the same; but if his feet do not fit the rubbers he wipes off the soles and heels of his shoes

with a solution of corrosive sublimate on a towel after finishing the visit to the scarlet fever ward. In visiting private patients we do not always do this; but now that our patients with dangerous contagious diseases are more and more generally cared for in hospitals, it is worth while, and is more necessary than ever to take this precaution to prevent cross infection. We all know the comparative frequency with which physicians bring home scarlet fever to their younger children, the children going around on all-fours. Within a year I have had in my care the one-year old child of a physician, who is very sure he himself brought home scarlet fever to his baby. He was taking care of a number of scarlet fever patients at the time, and it is very possible he brought home the infection on his feet. It is so easy and simple a matter to adopt Dr. Denny's timely suggestion that I hope others will try it as we have in Brookline.

Mr. Winslow: In connection with this scheme it is worth while to recall the typhoid fever epidemic in Springfield in 1892. I think the experts believed that the infection was carried from a tobacco field, in which typhoid bacilli occurred in human excreta, to a well in which milk cans were sunk. In that case infection was carried on the feet of workingmen.

Dr. Swarts: The reader of the paper might have mentioned one other opportunity of investigation, made possible by the introduction of water filtration by means of what is called the sand-bed filtration, where the surface of the bed must necessarily be scraped at intervals, and the employees who do the scraping must necessarily tread upon the cleansed surface of the bed as they remove the scum of the bed, and after passing over a field well fertilized with night-soil it would seem to be possible that the footwear might carry a considerable quantity of innoculating material by which the whole of the filtering bed might become infected in this way. That is one of the objections to the use of sand-bed filtration, as compared with mechanical filtration, where it is not necessary to tread upon the bed in order to cleanse it. I would like to ask of the representatives of the

State Board of Health having control of all water supplies in the State whether they extend their labors to the control of the changing of shoes by those operatives who are scraping the beds; if not, whether it would not be a good idea to control such a condition.

THE CHAIRMAN: I seem to be left as the representative of the Board to speak upon that matter. It does not seem to me a matter of any consequence, because we assume that the typhoid bacilli do get upon the surface of that bed in any case. It is exactly what the sand bed is there for—but they don't get through it.

DR. DURGIN: I would like to ask Dr. Chase if he recollects what stage of scarlet fever this child was in when the footwear of the doctor was supposed to take the infection away.

DR. CHASE: He had quite a number of scarlet fever patients at the time, and they were in various stages of the disease. He could not tell from which patient he brought the contagion home, but he was positive he himself brought it to his child.

DR. CHAPIN: Dr. Denny's paper is a very interesting one, and investigations of this kind cannot help being extremely suggestive and useful. But at the same time I cannot but feel that we should be very careful in making deductions from them. Of course, it must be admitted from what he has told us today that the infection of a number of diseases can be transmitted from one place to another on the feet; but, as Dr. Denny himself well said, what we want to know is what are the chances of that infection getting from the feet to other living beings. What we want to know in all these investigations—and in all our study of the infectious diseases—is the exact mode by which the virus passes from the sick person to the well. We want to know the path followed in the majority of cases. I wish we were sure of this, but it does not seem to me that at present we really know very much about it. It appears that most of our notions are guess work. Now, it is possible to guess that the shoes are an important factor

in carrying the disease from one person to another. It is possible to guess that the clothing is an important factor—that money, library books and school books are important factors—that the disease germs may be blown in the air from one person to another, and the disease spread in that way. So far as actual knowledge is concerned we appear at present to be very much at sea. Now, instead of guessing that the disease may be spread in the way mentioned, we are at liberty to guess that it is very rarely spread in any such way. We are at liberty to guess that, as a rule, the transmission of infection is pretty direct; that the disease poisons, the bacilli in diphtheria, for instance, are almost invariably transmitted in a pretty direct manner from the sick person to the well. Thus a person who is infected with diphtheria bacilli drinks out of a tumbler and some one else drinks out of the same tumbler shortly after before it is dry. A person who is infected with diphtheria puts a pencil in his mouth, and some one else puts that same pencil in his mouth within a few minutes and becomes infected. Those are direct means by which the bacilli are carried from one person to another. Now, one may guess that this is almost the sole manner in which disease is spread from the sick to the well. That guess has a good deal back of it. There is much to make us think that this guess is correct. Thus we find that it is not very easy for a person who has scarlet fever or diphtheria to infect others. All of you have noted plenty of instances where persons with scarlet fever or diphtheria have mingled freely with susceptible persons for days and weeks, and perhaps only one or two have become infected from them. Furthermore, we know that in diphtheria there are a large number of unrecognized cases of the disease, a very large number of persons who are not sick at all, but who are yet infected, and who are mingling freely with people in every walk of life and on all occasions, and it seems to me that opportunities for direct infection are very great indeed. So when we see that very often when there is close communication between sick and well, infection does not take place, that the infection appears to be somewhat difficult, and is not readily carried from one to another, we

should be very chary of attributing very much importance to the carrying of the poison of diphtheria and probably of scarlet fever and the other diseases, on clothing or books or shoes or anything of the kind. Of course, we must admit that such a thing is possible. There is no doubt but that it occasionally occurs. But if we place so much stress upon the carrying of disease in fomites, as is usually done, are we not straining at a gnat? It seems to me that we are, and that we are drawing away public attention from the real source of the trouble, the real source of the extension of the contagious disease, namely, the existence of a very large number of unrecognized cases which are not sick at all, but are yet infected with the bacilli or other organism causing the disease. We know that this is the case in diphtheria. We have every reason to believe that it is so in other diseases, and I think we should hesitate very much before we unduly alarm people about any danger which may come from carrying the disease germs on the feet or on dresses or clothing or books or money or things of that kind, where there are a number of changes between the sick and the well and where considerable time elapses.

Of course, it is very much easier to blame inanimate objects, like books and shoes and clothing, for carrying disease than to blame a person who is perfectly well. No one who is perfectly well, who has had no sign of sore throat or eruption, likes to think that he can be the bearer of disease; but we know that can happen in diphtheria, and we believe that it can in other diseases. It is these persons themselves, it seems to me, that do the harm, and not the clothing or other material things carried by them.

Where a doctor brings home diphtheria to his children—which by the way, it seems to me, is a very rare thing, for I have almost never known of a physician carrying contagion in my experience of twenty years, and I have been on the lookout—is it not infinitely more likely that the physician has the diphtheria bacilli growing in his throat, that he has been infected himself from some one of his patients and has carried it home to his children in that way than that he has carried it home on his overcoat or his whiskers or his shoes? As regards scarlet fever we do not

know that it is a bacterial disease, and we do not know with certainty the seat of infection, but we have reason to believe that the mucous secretions are infectious as they are in diphtheria, and also that well persons may have an infected throat or nose. In the case mentioned by Dr. Chase is it not more likely that the physician carried the disease home on his mucous membranes than on his clothing? It seems to me that in most instances it is the living person rather than inanimate objects that carry contagion, and that this is what we ought to teach.

THE CHAIRMAN: Is there anything else to be said on the subject of this very interesting paper?

DR. DENNY: I would like to say that I agree wholly with what Dr. Chapin has said—that infection is usually transmitted very directly from person to person, and usually from mild and unrecognized cases, and I don't think that the public should be stirred up about things of this sort. I should not think of bringing such a subject to the attention of the public. But it seems to me worth while to call to the attention of men who are engaged in preventing the spread of contagious disease the possibility of such a transmission, and especially the possibility of the transmission of tuberculosis. We don't know certainly how much danger there is from the sputum, which is around on the sidewalks or on the floors of our houses. Possibly we get infected more directly from other cases, but still, at the present time, when so much is being said and done to prevent the spread of tuberculosis from sputum, it seems to me as though we ought to consider the possibility of tuberculosis sputum being carried about in this way.

THE CHAIRMAN: If there is nothing more to be said upon this subject? Is there any other business to be brought before the Association at this time?

THE SECRETARY: I move we adjourn.

THE CHAIRMAN: If that be your pleasure, I will declare the Association adjourned.

ABSTRACTS, REVIEWS, NOTES AND NEWS.

Boards of Health are asked to send the Managing Editor notes of not more than one hundred and fifty words relating to new regulations passed, legal cases prosecuted, outbreaks of infection, unusual problems encountered, or other matters the publication of which may further the attainment of the objects of the Association.

References are indicated by numbers. See list at end of column.

ANTI-VIVISECTION BILL AGAIN DEFEATED.—House Bill No. 174 of this year, which forbade any animal experimentation whatever to Municipal Board of Health or Hospital laboratories throughout the State, and permitted to the State Board of Health only inoculation tests, was reported "leave to withdraw" by the Committee on Probate and Chancery, May 4th, 1904. Substitution of the bill for this report was rejected in the House by a vote of 90 to 35, or 72 per cent. against the bill.

This bill required the appointment of a Commission of three to supervise animal experimentation, "one of whom and only one" should be a physician. Ex-Governor Brackett, who supported the bill at the hearings, sat beside the Speaker during the debate. Dr. Wheatley of Abington, a member of the Massachusetts Association of Boards of Health, Mr. Grady of Boston, the leader of the Democrats in the House, Mr. Cox of Boston and Mr. James Clark of Medford all spoke against the bill. Dr. H. L. Plummer and Mr. A. L. Gavin, both of Boston, also opposed the bill. Mr. McManus of Natick supported the bill, and so did Mr. Woodhead of North Adams, notwithstanding that the Board of Health of North Adams signed the protest against it.

Thereafter, in the Senate, substitution of the bill for the adverse report was urged, May 11th, by Senator Callender. The bill was again defeated, 16 to 7, or about 70 per cent. against it.

At the hearings, Dr. Harold C. Ernst appeared against the bill as the representative of the various Massachusetts Colleges and Universities, Hospitals and Boards of Health, presenting for the latter the official protests of Boards of Health from 31 of the 33

cities of the Commonwealth, and from 50 of its towns. The Boards of the remaining two cities also signified their opposition to the bill, but failed to sign the protest.

AGAINST THE TOY PISTOL.—At a meeting of the Berkshire District Medical Society, Feb. 26, 1904, it was voted that;

"Whereas, 406 deaths from tetanus were reported as occurring in the United States in July, 1903, as a result of fourth of July celebrations, 363 of these deaths having been caused by toy pistols loaded with blank cartridges, and 17 by cannon crackers,

"Resolved, That the Berkshire District Medical Society is in favor of any legislation and municipal ordinances which will effectively stop the sale and use of toy pistols, blank cartridges and cannon crackers. *L. C. SWIFT, Secretary."*

IMPORTANT HEARING RELATIVE TO THE PROTECTION OF WATER SUPPLIES.—By a recent statute the State Board of Health of Massachusetts was authorized to "make rules and regulations to prevent the pollution and to secure the sanitary protection of all such waters as are used as sources of water supply." Acting under the provisions of this Statute (Revised Laws, Chapter 75, Section 113), the State Board of Health has made rules and regulations for several of the public water supplies of cities and towns, including Salem, Cambridge, Marlboro, Haverhill, Taunton, Pittsfield, Fitchburg, the Metropolitan Water District and several other places.

The density of the population in Massachusetts has increased to such a degree that it has become necessary to provide every possible safeguard for the many sources of water supply in order to protect them from the inevitable pollution which the collection of human beings in the neighborhood of such sources is bound to produce.

The city of Taunton acquired the right to take the waters of some of the great ponds in Lakeville, the largest fresh water

areas in the State. But the natural beauty of these lakes had already induced a considerable number of summer cottagers to acquire land and erect buildings upon the immediate borders of these lakes, and for this reason an application was made to the State Board of Health to make such regulations as would protect these waters from pollution. Hence an attempt is being made by these property owners, among whom are several Indians, who claim direct descent from Massasoit, through seven or eight generations, to repeal the statute already mentioned. As the general tendency of legislation since 1878 has been to give greater, rather than less protection, to public water supplies, it can hardly be expected that this attempt will prove successful. The experience of Pennsylvania towns, in which the most serious epidemics have occurred in consequence of water pollution, was due largely to the absence of such statutes as Massachusetts fortunately possesses.

A hearing was held at the State House on Monday, May 2, at which the petitioners were heard, asking for the enactment of a new statute, the effect of which would seriously impair the value of such regulations. At the time of going to press the result of the hearing was not known. *S. W. ABBOTT, M. D.*

UNDERTAKING AND EMBALMING.—By a resolve of the Legislature, March 28, 1904, the Massachusetts State Board of Health was directed to investigate the necessity for a desirability of legislation to regulate undertaking and embalming. The Board reported May 4, 1904. We give below the paragraphs from the report bearing most explicity on the matter.

"As a result of this investigation (of the existing laws and conditions relating to undertaking and embalming) it is apparent that there is already vested in local Boards of Health a power in such matters exceeding that conferred upon the State Board of Health, and entirely adequate to ensure that the undertaking business will continue to be carried on, as at present, in a manner generally satisfactory to the community." * * *

"In regard to the question of embalming, the Board is distinct-

ly of the opinion that, whatever value this practice may have in other respects, it cannot be regarded as necessary for, or contributing to, the protection of the public health. In the absence, then, of any necessity for new legislation to ensure the safe conduct into or through other States, of dead bodies shipped from this State in accordance with the requirements of existing statutes, and in the freedom from menace to the public health under existing conditions, the Board respectfully suggests that if for any reason new regulations to control the business of undertaking and embalming appear to be desirable, it must depend upon issues foreign to those upon which the Board feels itself competent to report."

AERIAL INFECTION FROM SMALLPOX HOSPITALS.—In the course of a suit, the Attorney-General and Others vs. the Mayor, Aldermen and City of Nottingham, England, recently heard before Mr. Justice Farwell, (Feb., 1904), much evidence concerning the extent and manner of distribution of infection from smallpox hospitals was considered. The Medical Officers of Health of the Essex County Council, of Basford, of Glasgow, of Bradford, and of Lambeth, testified that in their opinions aerial convection of the infective agent of smallpox is a serious source of danger in the neighborhood of such hospitals. The M. O. H.'s of Nottingham, Liverpool, Brighton, Staffordshire and others, did not agree with this, but believed that the spread of smallpox from a smallpox hospital is almost always to be ascribed to mal-administration in permitting intercourse with the people of the neighborhood to continue to a greater or less extent.

In summing up, Mr. Justice Farwell gave a long and closely reasoned opinion, and dismissed the case with costs, on the ground that the aerial convection of smallpox was not established by the evidence.

This case is interesting on account of the conflicting testimony given, but also because of the evidence that some smallpox hosvitals at least so not spread infection.

FEDERAL REGULATIONS CONCERNING VACCINES AND ANTITOXINS.—Rosenau, in a letter to *American Medicine,* calls attention to the act, signed July 1, 1902, "to regulate the sale of viruses, serums, toxins and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes."

This law requires that all establishments, native and foreign, engaged in such work, shall hold an unsuspended and unrevoked Government license, and prohibits interstate commerce in any product made in an illicit or unauthorized manner. It requires that every package of any such product shall bear the name, address and license number of the manufacturer, together with the name of the product, and the date beyond which it may become inert. False labelling is punishable by $500 fine, or imprisonment up to one year, or by both.

The U. S. Pub. Health and Marine Hosp. Service must detail an officer to inspect establishments having interstate commerce, and the Surgeon-General of this service, together with the Surgeon-Generals of the Army and Navy, constitute a board which may make rules, etc., controlling the licenses. The Director of the laboratory of this Service must examine the products, and licenses may be revoked for faulty methods of manufacture, faulty construction, faulty administration, impurities or weakness of products; already during a little over a year of operation of this law, four licenses have been revoked, and others have been refused, pending the making of indicated reformatory changes.

A STANDARD ANTITOXIN UNIT FROM AMERICAN SOURCES.—In the letter of Rosenau, just quoted, it is stated that his laboratory is engaged in the preparation of a standard toxin, after the character of Ehrlich's standard toxin, and that this standard toxin will be distributed to all interested in testing antitoxins. At the present time American laboratories depend principally on Ehrlich's laboratory for their supplies of such standard toxin. The ready determination of antitoxic strength

in terms of a standard unit having general acceptance will be of considerable advantage to the whole country.

DIPHTHERIA MORTALITY WITH ANTITOXIN.—The Chicago Board of Health has recently published statistics concerning 7435 cases of diphtheria, which received antitoxin. Amongst these the death rate was 6.5 per cent., while in the remaining, non-antitoxin cases, the death rate was 35 per cent., or more than five times as great. In other words, eight deaths out of ten in the latter group occurred simply from neglect of a simple and readily obtainable form of treatment, available to the poor as well as to the rich.

THE TWENTY-NINTH ANNUAL MEETING OF THE NEW JERSEY SANITARY ASSOCIATION was held Dec. 4, 1903. The proceedings have been published and are all excellent. We cannot forbear quoting a few paragraphs from the brief address of the President, Dr. John S. Leal, Health Officer of Paterson, N. J., although all interested in scientific hygiene should read the article itself. "We must teach that the great sanitary bugbear of the past—filth, filthy water and filthy air—are in themselves of little sanitary importance, and that measures directed against them alone, however commendable they may be, are not demanded by sanitary science.

"True sanitary science wars against infection whether it chances to be in filth or in purity, in filthy air or water or in that which is pure. It is just as dangerous, if not more so, in what is pure as in what is filthy. The measures used against it may incidentally aid in accomplishing other good things, but their prime and true object is the destruction of the infection.

"The converse is also true that measures which properly belong to public decency, public comfort and public policy may also incidentally aid in the fight against infection."

THE STATE LABORATORY OF HYGIENE OF NEW JERSEY, now under the directorship of R. B. Fitz-Randolph,

late Associate-Director of the Hoagland Laboratory, Brooklyn, has reached a high standard of efficiency, but while enjoying the confidence of the State Board of Health and of public hygienists throughout this country, it has received scant financial support from the Legislature of the current year. The same Legislature was prevented only by the Governor's veto from wrecking the excellent Sanitary Inspector law, emanating from the New Jersey Sanitary Association and approved by the well-known sanitarian, Dr. Henry Mitchell, secretary of the State Board of Health, passed one year ago, and received with general acclaim by the leading hygienists of New Jersey.

We would assure such legislators that they need not fear prosecution for adulteration should they mix brains with their legislation, notwithstanding the fact that, strictly speaking, such a compound might often properly come within the scope of the clause forbidding the addition of "substances foreign to the well-known article under whose name they are offered for consumption."

A CHANGE IN THE BOSTON BOARD OF HEALTH.—The Hon. Edwin L. Pilsbury, whose term of office expired May 1, 1904, failed of reappointment. Mr. Pilsbury, whose capacity and courtesy all members of this Association will remember with admiration and pleasure, has been a member of the Board for about twelve years, and has proved an excellent and efficient public servant. Political pressure at the last moment was alone responsible for his non-appointment. We cannot but regret the reason as well as the fact.

His successor, Dr. T. B. Shea, chief medical inspector, was selected by the Mayor independently of the political movement referred to, and his appointment illustrates two excellent principles—promotion of an officer who has proved his efficiency in a subordinate position and the choosing for a responsible technical and professional position one with training and experience for its important duties.

THE MAYOR OF SAN FRANCISCO has made it his business to deny the existence of plague in that city, and to obstruct all efforts against its spread. He has recently removed the whole City Board of Health, in whom the people had confidence, and has replaced them by men in sympathy with his policy. Six cases of plague were reported by the U. S. P. H. and M. H. S. as present in the city during February, 1904. (8.)

We cannot but regret that the distinguished visitor from the East should so far forget the courtesy due to the chief executive of the only American city which has yet shown him extended hospitality as to overstay his welcome, especially when that chief executive takes pains to state that the distinguished visitor has never been present at all. We suggest that the plague—or the Mayor—should align himself with the real facts as soon as possible.

DR. PETER H. BRYCE, for many years the Secretary of the Provincial Board of Health of Ontario, has recently been appointed Medical Inspector of Immigration, under the Dominion Government. He has established a detention hospital in Quebec, and is building also a hospital for the treatment of emigrants. He is in charge of the Medical Service to the Indians throughout the Dominion. His successor in the Secretaryship is Dr. Charles H. Hodgetts, of whom we hope a conduct of affairs reaching the high standard set by Dr. Bryce. The reports of the Board contain much of interest, particularly the recent one describing the work of Dr. John A. Amyot, Bacteriologist to the Board, on sewage purification at Berlin. If Dr. Hodgetts will inaugurate his term of office by an appeal to the Government to print his reports on paper, and with type, not quite so wholly disreputable as Dr. Bryce has been compelled to use, he will confer a great favor on those at a distance, whose chief acquaintance with the Provincial Board of Health work must necessarily be had from their pages.

DR. U. O. B. WINGATE, whose name has long been a household word in hygienic circles, a well-known member of the

American Public Health Association, and a thoroughly sound and efficient public health officer, was recently removed from his position as Secretary of the Wisconsin State Board of Health because, as one of the members of the Board put it, "the plum should be passed around." To Dr. Wingate this "reason" involves a tribute, since no one can imagine that it would have been offered had a better one been available. To Wisconsin and to its State Board the "reason" is a disgrace not easily to be forgotten or forgiven by the hygienic world.

DR. E. A. DE SCHWEINITZ died in Washington, Feb. 15th, 1904, of uræmia. He was chief of the Bio-chemic Division, Bureau of Animal Industries, U. S. Department of Agriculture, and was known everywhere for the high character of his work, particularly in the bacteriology and chemistry of tuberculosis.

MR. GEORGE C. WHIPPLE, at one time Biologist to the Boston Water Board, and for the last six years Biologist and Director of Mount Prospect Laboratory, Brooklyn Water Department, has recently resigned to go into private practice as a Sanitary Expert in New York City.

CHEMICAL DETECTION OF RAW MILK.—Raw milk, treated with a solution of orthomethylaminophenol sulphate, followed by hydrogen peroxide, develops a brilliant deep red color. If heated at a temperature of 75 C. for half an hour, the milk will no longer react. Higher temperatures destroy the reaction more rapidly, but a temperature of 70 C. for an hour does not prevent the reaction. Raw milk, masquerading as scalded or Pasteurized, can be recognized by this method. So delicate is it that one per cent. of raw milk added to scalded milk can be detected. (5.)

AN INDIAN SNAKE-STONE.—The well known stories concerning stones capable, when applied to snake bites, sometimes to mad-dog bites, of adhering to the wound and absorbing the

poisons, have been put to the test by H. Watkins-Pitchford, Government Bacteriologist in Pietermaritzburg, Natal. The stone tested came from India, accompanied by a statement from the (white) owner that he had obtained it from a native whose life the stone had saved in his (the owner's) presence.

Careful tests on rabbits, using the venoms of various poisonous snakes, and following in the application of the stone the ceremonies described, exactly in the native fashion, showed, as might have been expected, that the stone had absolutely no effect whatever upon the symptoms or fatality caused by the snake poison. (7.)

A NEW METHOD OF GROWING ANAEROBES.—B. R. Rickards, 1st Asst. Bacteriologist, Boston Board of Health Laboratory, devised the simple plan of inverting ordinary tubes of solid media, inoculated in the ordinary way, in the ordinary solution of pyrogallol and alkali, contained in a tumbler or other convenient receptacle. For liquid media, a U-tube, with one end sealed, and this half filled with the inoculated medium, is similarly inverted with the unsealed end in the pyrogallol. For plates, the liquefied nutrient jelly is poured into a sterile erlenmeyer, and after solidification of the jelly, the flask is likewise inverted. In all cases, the pyrogallol solution rises in the medium container as the oxygen is absorbed. A fuller account is to be found in the Centrablatt fuer Bakteriologie.

SEWAGE PURIFICATION TESTS IN COLUMBUS, O.—About $50,000 have been appropriated for the testing of the various known methods of purification, the tests to run for a year from about July 1, 1904. The object is to determine the best conditions for Columbus, but the broad views shown in the planning of this work, and the character of the men who will conduct it, ensure that much will be added to the general stock of knowledge on this subject.

Mr. George A. Johnson, who was a member of the laboratory force which conducted the well-known water-filtration experi-

ments in Louisville in 1895-96, under Mr. George W. Fuller, and who has since been engaged in similar work in Cincinnati, Washington, St. Louis and other cities, will be in charge. Mr. A. E. Kimberly of the Lawrence Experiment Station of this State will be First Asst. Chemist. The First Asst. Bacteriologist has been selected, we believe, but his name has not yet been made public.

DISEASE, OTHER THAN TYPHOID FEVER, FROM MILK.—During an outbreak of acute sore throat in England, traced by Vincent to one of two dairies, from which the infection had been distributed, a death occurred also from acute septic colitis, and Vincent convinced himself that this also was due to the use by the patient of the infected milk. (6.)

PNEUMONIA HAS BEEN PLACED ON THE REPORTABLE LIST in New York City, for the first time, it is said, in any city of this country. This is a marked recognition of the infectious nature of the disease, and of its increased ravages in late years.

The impression seems to be growing that even the ordinary colds are infectious, but these, as well as pneumonia, require a lowered condition of vitality in some form in the recipient before simple transmission of the infective agents becomes significant. We suggest that those Boards of Health which feel inclined to place pneumonia on the reportable list should be prepared to support their views by statistics, showing the average number of cases which can be traced to a single original case, amongst members of the same household and others closely associated with the patient, as has been done in tuberculosis.

TUBERCLE BACILLI IN OLD LIBRARY BOOKS.—Those who are in the habit of separating stuck-together leaves in public library books with finger-tips moistened with their own saliva, may, if well, become infected with tubercle bacilli, or if consumptives themselves, place their bacilli where others, following the same practices, may remove them to their own mouths.

Mitelescu, examining the books of a public library, chiefly from the fiction department, found that one-third of those over two years in use yielded tubercle bacilli from the leaves, when these were washed, and the washings centrifugalized and injected into guinea-pigs.

On clean paper the bacilli die out readily, from drying, but when dirty leaves stick together, evaporation is impeded, and the bacilli live longer. They were not found in books less than two years old (although we do not understand why), nor on the covers of any of the books. (10.)

It must not be forgotten that consumptives may infect books in the mere act of coughing, or even laughing and talking, when the book is open before them, and that such infection is more likely to remain active, shielded as it is from the action of sunlight and air when the book is closed, than similar infection of ordinary exposed surfaces. While it is unlikely that any large number of people become infected from this source, the handling of library books with moistened hands, a bad habit at best, receives additional condemnation from these results.

REGISTRATION OF TUBERCULOSIS.—Lecturing for the Phipps Institute, Dr. Herman M. Biggs of the New York Health Dept. points out that the objections to this can be met easily by providing that no action will be taken in the cases reported, unless the circumstances are such that administrative interference is necessary or desirable.

This is the principle on which the Boston Board of Health has proceeded since registration was made compulsory and comparatively little difficulty has been found in securing registration under this understanding.

FREE HOSPITALS FOR CONSUMPTIVES IN TORONTO.—This hospital, situated about ten miles outside of Toronto, is to be opened as soon as the necessary funds for furnishings, etc., are secured. A site near the new buildings of the University of Toronto Medical Faculty has been decided upon for

a free dispensary for consumptives. So far about $400,000 has been expended in anti-tuberculosis work in Ontario by the National Sanitarium Association.

A PUBLIC TUBERCULOSIS CLINIC has been opened by the New York Health Department, near its headquarters, 55th Street and 6th Avenue. Diagnosis, circulars of information, treatment, sputum cups, etc., are offered free to indigents. A special corps of trained nurses is provided to care for poor patients at their homes. The co-operation of charitable organizations for the supply of fuel, ice, etc., has been secured. Suitable cases are sent to hospitals or sanitaria. Special attention is paid to preventing the spread of the disease, particularly amongst the children of the infected families. (9.)

ARE ALL SPECIES OF ANOPHELES HARMFUL?—Hirschberg throws doubt on *Anopheles punctipennis* as a transmitter of malaria, while confirming the capacity of *Anopheles maculipennis* in this direction. His method was to permit the mosquitoes to bite patients suffering from malaria in favorable stages, and then after waiting the proper interval, to section the mosquitoes and search for the parasites within them. In 58 tests with *A. punctipennis* he did not succeed in finding parasites at all, while in 48 tests with *A. maculipennis,* 8 positive results were obtained. (2.)

DENGUE, OR BREAK BONE FEVER, a hitherto mysterious affection of the Far East, is now ascribed by Dr. Graham of Beirut to a parasite transmitted by mosquitoes after the manner of malaria.

MEDICAL INSPECTORS APPOINTED.—Forty medical inspectors have been recently appointed by the Health Department of Philadelphia, pursuant to a recent act passed by the City Council. These medical inspectors are to give their entire time to the city, and each is placed in charge of a certain district. It is

his duty to report all cases of infectious diseases, to trace the source of epidemics, to report any unhygienic conditions, to inspect public schools, etc. Each inspector is to receive a salary of $1200 per annum. (3.)

INSPECTION OF SCHOOL CHILDREN IN CHICAGO.—It is proposed in Chicago to thoroughly inspect the school children in each of the city schools. Teachers and principals must report for medical examination any pupils they believe physically defective, deformed, or afflicted with a functional disorder, The rules provide that the examinations shall be made by a school medical inspector in the office of the principal and under the latter's supervision. (3.)

VACCINATION OF PUBLIC SCHOOL CHILDREN in New York State, according to the decision of Attorney-General Cunneen, need not take in order to satisfy the legal requirements. It is evidently sufficient, in New York, to have "the form of godliness without the power thereof."

A PERMANENT EXHIBIT OF A HYGIENIC HOME, containing everything tending to promote the welfare of its inhabitants, particularly designed to meet the requirements of the working man, is maintained in Berlin. This idea might well be adopted in the larger cities in this country.

DR. JOHN N. HURTY, the well known Secretary of the State Board of Health of Indiana, has recently been unanimously re-elected for a period for four years. Dr. Hurty is in charge of the Hygienic Exhibit at the St. Louis Exposition.

EPIDEMIC CEREBRO-SPINAL MENINGITIS, known familiarly as "spotted fever," is reported from Hartford, Conn., to the extent of fifty-eight cases and thirty-two deaths in April. Strict measures of isolation have been carried out by the Board of Health.

COMPULSORY REGISTRATION OF TUBERCULOSIS as a contagious disease was voted down by a tie vote in a recent meeting of the Philadelphia County Medical Society.

LECTURES FOR MEDICAL INSPECTORS are being conducted under the auspices of Director Martin of the Philadelphia Board of Health.

TYPHOID BACILLI ISOLATED FROM DRINKING WATER.—In a previous issue we recorded various findings of this organism in water. To make the list more complete, we have below starred a few additional names quoted in the article of Konradi (see below), and have added the references for all.

Fischer and Flatau	Cent. f. Bakt.,	Ref.	Abt. 1,		29
Genersich	"	"	"		27
Hankin	"	"			26
*Hanriot	"	"	Ref.		29
*Konradi	"	"	Orig.		35
Kubler and Neufeld	Zeit. f. Hyg.,		Bd. 31		
Loesener	Arb. a. d. kais. Gesundheit.		Bd. 11		
*Tavel	Cent. f. Bakt., Orig.				33
Wesbrook	Rep. Minn. St. Bd. Health for '95-'98				
*Bonhoff (doubtful)	Cent. f. Bakt., Orig.		Abt. 1,		33

B. R. RICHARDS.

TYPHOID FEVER DIAGNOSTICUM.—Under this name Ficker has placed in the hands of a manufacturing chemist for sale a slightly turbid fluid for use after the fashion of the Widal test, for the diagnosis of typhoid fever. To a little of this fluid the physician adds a drop of the patient's blood. In a short time the liquid shows a flocculation, and in time becomes clear by sedimentation, if the reaction be present. The test does not require a microscope, and can be applied at the bedside, while the fluid remains good for nine months. (11.)

Ruediger of Chicago has recently recommended for use in the same manner cultures of typhoid bacilli, killed by the addition of formalin. He claims for this method saving in time, as well as in trouble, over the usual method with living cultures. (12.)

TYPHOID BACILLI IN WELL PERSONS.—Juergens, examining the members of households where typhoid fever was present, found the bacilli, not only in the sick members, but also in those but slightly affected, and even in well persons associated with the clinically developed cases. (13.)

TYPHOID FEVER FROM CREAM IN WILLIAMSTOWN, MASS.—The investigation of thirteen cases of typhoid fever which occurred at Williamstown during November, 1903, among the students of Williams College, shows that the probable source of infection was from a can of heavy cream, this being the only article of diet common to all the patients.

The cream supply was primarily obtained from Hoosick, N. Y., being shipped daily to the North Adams Milk Co., and subsequently delivered by eight different routes, seven of which were in North Adams and the other in Williamstown. No cases of the disease occurred among people using the regular supply at North Adams, and the investigation did not show the exact source of infection in the cream which went to Williamstown. A portion of this cream, returned daily to the milk depot, was used as a special supply for afternoon orders, and seven cases of typhoid fever occurred at North Adams among those who might have received the cream in this way. As additional evidence of the cream being the source of infection it was found that one member of the Tufts College football team, which played at Williamstown during the period when the infection of these patients probably occurred, and who had access to the cream, was subsequently taken ill with the disease.

On account of the length of time which elapsed from the date of the patient's going to bed to the reporting of the cases to the State Board of Health, the investigation could not be called complete, and it was not possible to obtain information which would point to the exact source of infection, on account of this lapse of time and the consequent loss of important connecting facts.—

F. L. MORSE, M. D.

TYPHOID FEVER FROM MILK IN PLYMOUTH, MASS.—On Feb. 1 the attention of the State Board of Health was called by the Board of Health of the town of Plymouth to the presence of an unusual number of cases of typhoid fever in the town, and it was asked that an investigation be made as to the cause of the disease.

From Jan. 2nd to Feb. 3rd 28 patients were found to have gone to bed ill with typhoid fever, 18 of them previous to the 15th of the month, and the remainder up to and including the 26th. All these patients had resided in the town for some time, and none had been away on any vacation, while with but one exception all had taken milk of one producer by the name of Finney. This exception was a young woman to whom the milkman was paying attention.

In the milkman's family five members were sick with the disease on Feb. 1st, the father, mother and three children. The milk barn is located about a mile from the home, and there are accommodations for twenty head of cattle, the milking being done by two of the boys. The milk was brought directly to the house, placed in a 100-qt. mixing can, cooled, and subsequently turned into 8-qt. cans for delivery. A small amount was placed in quart cans for the use of special customers, but ordinarily the milk was dispensed by measure at the house of each customer.

One of the boys doing the milking was taken ill on Jan. 9th, but continued to work until Jan. 15th, when he gave up work entirely, and three days later, on account of the appearance of the disease among the customers the milk supply was voluntarily suspended.

There have been four deaths in the course of the epidemic. One of the early cases to become ill was a patient living in a house located on the shores of Town Brook Pond. The attending physician did not give instructions relating to the disinfection of the discharges, and they had been thrown sometimes into a privy located on the water's edge, and at other times upon the ice which had formed upon the pond.

During the month of January about 1000 tons of ice had been

cut on this pond, 700 tons to be used for refrigerating purposes only, and 300 tons to be used in the fish business. The harvesting of the latter supply was completed on Jan. 28th, and ice was taken from the pond within 20 feet of the privy already mentioned. A sample of ice was obtained at a point near this locality and sent to Lawrence for examination. It showed numerous bacteria present, and upon the advice of the State Board of Health all of the ice was prevented from being used.—

F. L. MORSE, M. D.

TYPHOID EPIDEMIC IN WATERTOWN.—Information from Watertown, N. Y., March 10, says: George A. Soper of New York, the sanitary expert who is in charge of the typhoid fever situation here, says that there is a marked improvement in conditions. The number of cases reported daily shows a decided decrease, and the total number of cases is considerably less. The number of cases now in the city is less than 500. Arrangements have been practically completed for supplying the city with pure spring water. A number of tank wagons will be put into commission, and kept until the filtration plant is in operation next fall.

LEPROSY ON CAPE COD.—A case of leprosy has been discovered at North Harwich, the patient being a Portuguese 38 years of age, who has resided in this country for twelve years. His father, mother and sister are said to have died with the disease before his arrival in this country. His symptoms developed about five years ago with the formation upon the forearms of tubercles, which afterwards ulcerated. He has been treated at New Bedford by two different physicians, but the disease was not recognized by them. At the present time the face is covered with small tubercles the size of the tip of the little finger, with numerous ulcerations on the upper and lower extremities. Numerous cicatrices are present upon the forearms, indicating old ulcers which have subsequently healed. The roof of the mouth and nasal passages are also ulcerated, and there is considerable swelling of the face and hands.

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JOHN CREAR
LIBRARY

The slight infectious character of this disease must be apparent when it is known that this man has been free to go and come in the past five years, during which time he has been in an infectious state, without giving rise to any other case. He is at present quarantined by the Board of Health of the town.

F. L. MORSE, M. D.

SMALLPOX IN LEOMINSTER.—A case of smallpox was reported from the town of Leominster on May 2nd, this being the first case of the disease existing in the eastern part of the State for a period of about two months. The patient is a French Canadian 34 years of age, who has never been vaccinated.

F. L. MORSE, M. D.

MERCURIC BICHLORIDE, AS A DISINFECTANT, NOT HARMFUL THROUGH VAPOR.—Bertarelli has investigated during two years the effect of disinfection by mercuric bichloride, on the disinfectors, and on the persons living in rooms after such disinfection, in Turin, where solutions of one to one hundred strength are used regularly.

The urine and feces were examined, and animals, enclosed in experimental chambers treated with the solutions, were observed.

He concludes that no risk of mercurial poisoning need be feared from the emanations of premises thus disinfected.

The solutions of "bichloride" used in this country rarely approach in strength the figures quoted for Turin, so that it appears proper to dismiss any haunting qualms which may have existed in their use. Of course, precautions against accidental swallowing of the solutions require the same attention as heretofore. (4.)

COAL SMOKE CONSISTS of solid matter and gases. The solid matter is made up of about equal parts of carbon and coal-ash, rather less than two pounds of each being thrown off in the burning of each ton of coal.

The gaseous matter consists of carbon dioxid, from 2 to 11 per cent by volume; carbon monoxid, .3 to 0 per cent.; oxygen, 7 to 18 per cent.; nitrogen about 80 per cent., and traces of hydrogen and of a large variety of hydrocarbons.

Smoke-consuming devices remove the solid matters largely, but not the gases. The economy of these devices lies, not, as is often supposed, in the saving of the carbon otherwise wasted, which is too small an item to be of much value, but in the added efficiency gained from the use of the methods of firing necessary to secure smokelessness, and in the smaller amount of hired help required. Under ordinary conditions, one pound of coal evaporates from 5 to 6 pounds of water, but under smokeless conditions, from 6 to 7 pounds. The total saving is put at 15 to 30 per cent.—(*From notes furnished by Prof. A. H. Gill.*)

ANTHRAX IN LYNN.—*The Boston Medical and Surgical Journal* of April 21st, 1904, states that fifteen cases of anthrax have occurred in Lynn, Mass., during the last three or four years, and urges investigation, with a view to prevention.

OYSTERS AND CLAMS.—"Seventy-seven samples of oysters have been examined by the New Hampshire State Board of Health Laboratory for boric acid and in thirty-four cases it was present. When the inspection was first commenced every sample of tub oysters contained boric acid, and the results obtained from samples from Dover, Portsmouth, Manchester and Concord showed conclusively that it was the practice of Boston wholesalers to add boric acid, or a preparation known as 'Preservaline' and containing boric acid, to every tub of oysters they sent out. A vigorous correspondence with dealers in Norfolk and Providence River tub oysters produced such beneficial results that on the last inspection of oysters from the above-named cities but little boric acid was found. The practice of preserving oysters by the liberal use of boric acid permitted the small grocer or marketman to keep oysters on his counter, without ice, in warm weather, as long as any remained unsold. We must conclude that a pres-

ervative active enough to arrest decay in such perishable articles as oysters, under such conditions, would not fail to arrest, in a like manner, the action of the digestive ferments.

"Clams are equally liable to adulteration by preservatives, and because of their less common use may contain even larger quantities of boric acid.

"The action of the wholesale houses in quickly abandoning the use of boric acid when notified by their customers that they were not allowed to sell goods so treated, proves the practice to be unnecessary." (1.)

NEW MILK REGULATION.—The Boston Board of Health has amended its milk regulations of 1898 by the addition (April 29, 1904,) of a paragraph relating to bacteriological examinations and control as follows:

> Art. IV., sect. 1.—No person, by himself or by his servant or agent, or as the servant or agent of any other person, firm, or corporation, shall bring into the city of Boston for purposes of sale, exchange or delivery, or sell, exchange, or deliver any milk, or cream which contains more than 500,000 bacteria per cubic centimeter, or which has a temperature higher than fifty degrees Fahrenheit.

Routine bacteriological examinations of the Boston milk supply are now being arranged for at the Boston Board of Health Laboratory.

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BOOKS.

ELEMENTS OF WATER BACTERIOLOGY.—Prescott (S. C.), and Winslow (C. E. A.) John Wiley & Sons. 1904. Price, $1.00.

For a long time there has been an urgent need of a treatise on Water Bacteriology, which would not only give the methods in use in Europe, but also the especially facile procedures which have been worked out in American laboratories. The authors have met this need with a well-arranged and practical volume of 125 pages.

Some criticisms may be made of the mediocre press work, of the ambiguous wording in one or two places and of the rather poor proof reading. For example, in the diagram on Page 7, one of the two "Nitrates" should be "Nitrates." On Page 9, it is stated that "A good river water under favorable conditions should thus contain only a few hundred bacteria." Would not the reader get the impression that all waters with less than

a few hundred bacteria are good, and all with a few thousand bacteria (unpolluted muddy streams) are bad?

In the first paragraph on Page 38 there are two indistinct letters and a split infinitive. On Page 45 it would be better to say "more common"; and "the latter" refers to a word four lines back. It would perhaps be better to give the date of Johnson's paper, Page 75.

The subject matter itself in the book is excellent. One can only be impressed with the careful presentation of the subject. Especially praiseworthy is the bibliographical work and the convenience of the references. Especially well balanced are the chapters on the Significance of the Presence of *B. coli* and Other Intestinal Bacteria in Water. The authors take the sound position that a sample of water free from *B. coli* is undoubtedly safe, and that its continued presence in 1-c. c. samples is an index of serious pollution.

Chapter IX, which treats of intestinal bacteria other than *B. coli,* is an excellent summary of the present knowledge of the sanitary significance of this class of bacteria. Much of this chapter is new. The authors say that the presence of *Streptococci* is valuable confirmatory evidence of dangerous pollution.

The methods given for the examination of water are excellent. Many of them are the same as those recommended by the American Public Health Association. The other methods are largely supplementary or are new methods not discussed by the Association. The outline of the methods is very well given and is in general very clear. One might ask if double dilution (Page 28) were not the best method for handling samples rich in bacteria. On Page 44 it is stated that bacteria develop very little at the body temperature after 24 hours of incubation. Can this be strictly true?

While reading Page 54 one will ask if natural immunity does not protect the human race to some extent.

In the last chapter the value of bacterial methods is set forth very well. However, the authors are inclined to overestimate the accuracy of the various methods. The reading is easier than

the doing. Again, there is perhaps a tendency to forget that while the bacterial examination in many cases is a sanitary *sine qua non,* it is seldom the *ne plus ultra.*

Everyone interested in the analysis of water should own a copy of this little book. It is the best of its kind in any language, and with the minor errors eliminated in the future editions, should have a wide circulation.—*R. S. W.*

GENERAL PATHOLOGY.—By Sidney Martin, M. D., F. R. S., F. R. C. P., Professor of Pathology at University College; Physician to University College Hospital, London. With numerous woodcuts from micro-photographs, and other illustrations, including many in colors. Philadelphia, 1904. P. Blakiston's Son & Co. Pages, 495, with index, preface and introduction.

Based on lectures delivered at University College, and intended primarily for students, this book seems to us better fitted for those already somewhat familiar with the subject than it is for the beginner, to whom detailed explanations are necessary if he is to secure any consecutive and logical view of the whole. Nevertheless the author has succeeded in covering the chief fields of modern pathology in clear language. We are particularly pleased with his advocacy of physiological pathology, believing that the term pathology is too often restricted to the mere anatomy of disease. Disease is a process in a machine, the autopsy revealing merely a vertical section through the process, with the machine stopped. The divorcement of clinical research and teaching from pathological research and teaching not infrequently results in the student receiving the impression, not formularized, but latent, that every disease possesses a dual personality; he carries two distinct pictures of pneumonia, say, with him; one, the pneumonia of his clinical teacher, existing only in the hospital ward; the other, the pneumonia of his pathological teacher, existing only in the autopsy room. To substitute a proper composite picture these two are the real basis of successful medical teaching.

SANITARY ENGINEERING NOTES.

ROBERT SPURR WESTON, M. A.,
Assoc. M. Boston Soc. C. E.

REPORT OF THE SPECIAL COMMISSION ON THE WATER SUPPLY OF SPRINGFIELD, MASS., 1904.—The present Ludlow and Jabish Brook supplies are subject to very numerous growths of organisms, principally anabæna, which give rise to disagreeable tastes and odors in the water. Consequently the improvement of the present supply, or the taking of a new supply from another source, is becoming a pressing question.

The recent report by Samuel M. Gray, M. Am. Soc. C. E., and George W. Fuller, Assoc. M. Am. Soc. C. E., with the appended report of E. E. Lochridge, Resident Engineer, discusses the whole problem in a thorough manner.

Experiments by Mr. Lochridge demonstrated that the present supply could be purified by double filtration, together with repeated aeration. This purified supply would be good for 15,000,000 gals. per diem, and could be supplemented by filtered Connecticut River water from above Holyoke. This combination would be the cheapest method of supplying the city with 25,000,000 gals. per diem.

The engineers considered supplementing the Ludlow water with that of the Scantic River (filtered), and investigated the practicability of supplying the city solely with filtered Connecticut River water. They also studied the Westfield River at Huntington.

The estimated cost of the various supplies per million gallons, on a basis of 25,000,000 gals. per day, is as follows:

Ludlow Reservoir and Connecticut River . . .	$25.44
Westfield at Huntington	27.76
Ludlow and Scantic	26.89
Connecticut River	27.08

In view of the extreme difficulty of purifying the Ludlow water, the necessity of pumping the Connecticut River supply, the small amount of pollution of the Westfield—a gravity supply

—and the slight differences in cost, the engineers have recommended the most desirable supply, namely, the Westfield River at Huntington. The estimated cost of this construction is $4,303,990, which, although about $1,000,000 above the cost of the Ludlow and Connecticut River scheme, is well within the means of the Water Department, particularly if the excessive consumption of water be lessened.

It is gratifying to note that the engineers have recommended that all water, even the upland water, be filtered. However, the names of the engineers were a guarantee that this modern position would be taken. The so-called "unpolluted" watersheds which are available for water supply are not numerous.

THE EFFECT OF POLLUTED RIVERS UPON THE NEIGHBORING GROUND WATER.—Wolf, K. (Arb. aus den Kgl. hygien. Instituten zu Dresden. Vol I, 1903, p. 291.)—The Dresden water supply is taken from the gravel layers, which extend underneath the Elbe River. At times of flood the numbers of bacteria in the ground water rises to several thousand per cubic centimeter. Several of these bacteria were isolated from the ground water. Two of them were determined to be *B. coli* and *B. vulgaris*, respectively. The author suggests that the water of filter galleries and wells adjacent to rivers should be analyzed at all stages of the river before deciding upon the ground water as a source of supply.

NEW METHOD FOR THE DETERMINATION OF THE VELOCITY OF GROUND WATER FLOW.—Sclichter. (Jour. f. Gas. und Wasserversorgung, 1903, No. 12, p. 230.)—In place of studying the rate of passage of salt or dye stuff through the ground, the author introduces ammonium chloride at the higher of the two points in the ground water table, and brings them into an electric circuit, thus measuring the electroconductivity of the soil, which, on the appearance of the ammonium chloride at the second and lower observation point, shows a sudden change.

A NEW COAGULANT FOR USE WITH RAPID FILTERS.—In several rapid filter plants, for example, Lorain, O., and Danville, Ill., the use of sulphate of alumina has been stopped and lime and ferrous sulphate have been used in its place, thereby effecting a considerable cost saving, with continuance of good bacterial results. A. C. Brown (Engineering Record, Vol. 48, p. 701, 1903) describes his experience with this coagulant as used at Lorain.

BACTERIA IN SOIL IN RELATION TO INFILTRATION GALLERIES FOR WATER SUPPLY. G. C. Whipple. (Engineering Record, Vol. 48, p. 501-2.)—Experiments were made to determine the efficiency of the soil for removing bacteria from water collected by filter galleries, which galleries were constructed of vitrified pipe, laid with open joints, in trenches from 10 to 20 ft. deep, and surrounded with gravel or broken stone. One typical experiment is selected for an example.

Depth Below Surface (Ft.)	Bacteria per Gram of Soil.
0.	136,000
0.5	115,800
1	6,800
2	2,850
3	885
4	380
5	60
6	00
7	00
8	00

Mr. Whipple concludes that "The sand below 5 ft. in depth never contains more than a very small number of bacteria. Tests for *B. coli* were negative."

These experiments confirm the belief that wells are most frequently contaminated from the surface, and seldom through sandy soils. Fissured soils, however, may allow the direct passage of water from a source of pollution to a well.

SEWAGE DISPOSAL IN IOWA. A. Marston. (Jour. Western Soc. E.)—Reviewed in American Chemical Research, Vol. X, No. 4, by L. P. Kinnicutt.) This paper gives a detailed account of the eleven sewage disposal plants in the State of Iowa. They are all modern plants, using the septic tank. The reader is referred to Prof. Kinnicutt's review or the original paper for a fuller account.

FILTERS, VERSUS CONTACT BEDS AND SEWAGE PURIFICATION. *Municipal Engineer.* Vol. XXVI, p. 111-117; also Journ. Am. Chem. Research, Vol. X, No. 4.)—In this paper the author concludes that the septic tank is a necessary preliminary to sewage purification. It is to be noted that the English practice is to provide from one to one and one-half days' storage in the septic tank, while the American practice is to store the sewage from one-half to one day only. Regarding the treatment of the septic tank effluent, whether by means of sand beds, contact beds, or trickling beds, the author states that the tendency of the English practice is away from the contact beds and toward the trickling bed. These latter are built of coarse material, and the sewage is applied continuously in the form of a spray. In cold climates there would be danger of freezing were trickling beds used.

THE TARRING OF MACADAMIZED ROADS TO PREVENT DUST. Schottelius and Guglielminetti (Muench, med. Wochenschrift, 1903, No. 25, p. 1068.)—The authors note that pneumonia, influenza, diphtheria, etc., are increased by breathing dust. They show this by adequate statistics. They describe the process for preventing the same by covering the road with a layer of tar in the following manner.

On a dry and warm day the cleaned and rolled macadam is given one or two coats of coal tar previously heated to 60 degrees C. After two to three hours the tar is strewn with dry sand. The tar absorbs rapidly, and it is claimed that dust is diminished. It is said that one pound of tar will cover 5 sq. ft.,

and that it would cost about $150 to tar a mile of road 18 ft. wide. Petroleum is not a satisfactory substitute for tar.

CIDER VINEGAR AND SUGGESTED STANDARDS OF PURITY. (Albert E. Leach and Herman C. Lythgoe. *Journal American Chemical Society,* Vol. XXVI. p. 375.)—The authors give analyses of many true and also many sophisticated vinegars, and describe the methods used for analyzing the same. As a result of their experience they suggest the following standard:

"The acetic acid shall be more than 4.50 per cent.; the cider vinegar solids more than 2 per cent.; the ash should constitute at least 6 per cent. of the solids; the alkalinity of 1 gram of ash should be equivalent to at least 65 c. c. of tenth-normal acid; at least 50 per cent. of the phosphates in the ash should be soluble in water. The reducing sugars should be the same in amount after as before inversion, and should not exceed 25 per cent. of the solids. The polarization, expressed in terms of 200 mm. of undiluted vinegar, should lie between -0.1 degree and -4.0 degree Ventzke. Malic acid should be indicated by both calcium chloride and the lead acetate test."

"Aside from the test for acid and total solids, by far the most important tests are the polarization and the tests for malic acid."

POPULAR ESSAYS ON HYGIENE AND SANITATION.

(A Series of Leaflets designed to teach in simple language some of the more important Lessons of the Time concerning Health and Disease.)*

SERIES A. ON DIRT AND DISEASE.

No. 1. WHY DIRT IS DANGEROUS.

Dirt and disease are apt to go together, but until lately no one knew why. Today we know that dirt and disease are often closely connected, because dirt is generally not merely dead earth but rather a kind of *living earth,* crowded with unseen and almost countless *germs* or *microbes,* many of which may be dangerous and even deadly.

WHAT IS DIRT? We use the term dirt for various things: for "earth," for "soil," and for "stains" and "spots" of many kinds, but dirty dishes, dirty faces, dirty clothing, dirty shoes and dirty streets often mean something foul or filthy. The word dirt itself comes from an older word drit (meaning dung or excrement), and, strictly speaking, the word "dirt" should not be used for good clean earth, or virgin soil, or sands and gravels, such as are found in sea beaches or sandbanks or deserts. It really ought to be kept for dung or excrement or filth, or for earth, soil or sands polluted or stained with dung, excrement or filth.

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The present is the first (No. 1) in SERIES A. ON DIRT AND DISEASE.

Some of those to follow are:—

No. 2. WHY DIRTY MILK IS DANGEROUS.
No. 3. WHY DIRTY WATER IS DANGEROUS.
No. 4. WHY DIRTY STREETS ARE DANGEROUS.
No. 5. WHY DIRTY PERSONS ARE DANGEROUS.

Other Leaflets may eventually be prepared upon "Microbes,— Good and Bad;" "Some Common Diseases: How they Come and how to Avoid them;" "Farm Sanitation;" "Why Flies are Filthy and Dangerous;" and other practical sanitary and hygienic topics.

It is hoped that Boards of Health, School Boards, Hospital Authorities, Charity Workers, Health-Education Leagues, Anti-Tuberculosis Societies and other Educators or Philanthropic Persons and Organizations may make use of this Leaflet and those which are to follow in that campaign of Sanitary education in which all civilized peoples must sooner or later participate.

Reprints of the Essay here published (SERIES A, No. 1—WHY DIRT IS DANGEROUS) may be had (postpaid) by addressing the Biological Department, Mass. Institute of Technology, Boston, Mass., and enclosing postage stamps according to the following schedule:—

One to fifty copies . . . . . 2 cents each.
Fifty or more copies . . . . . 1 cent "

WHY DIRT IS DANGEROUS. Dirt is dangerous chiefly because it is very often dung, excrement or filth, and as such may be the carrier of disease germs or microbes from diseased human beings or other animals to persons who, though well, are able to catch a disease.

In typhoid fever, for example, germs peculiar to that disease are thrown off (excreted) in the bowel discharges, urine and spit of the patient. These excreta, as they are called, may thus become carriers of typhoid fever, because they carry its germs, and linen, bed-pans, spittoons, handkerchiefs and the like, soiled or dirtied by any of these excreta, may be bearers of the living poisonous germs of this terrible disease from a patient to a laundress, a maidservant, a nurse, or to anyone whose hands become dirty by handling such articles or excreta. From hands so soiled contagion may be carried to plates, cups, saucers, spoons, and above all, food.

HOW DIRT IS DANGEROUS. Dirt being often really dung, excrement or filth, is dangerous because it passes so readily and in so many ways from the patient to the public. We have just spoken of laundresses and others whose hands may become dirty by handling dirty linen, dirty bedpans and the like. Such persons are themselves in great danger from this dirt and often actually "catch" the disease. But if the urine or bowel discharges of typhoid fever patients are thrown into a brook leading to a reservoir of drinking water, the lives of all the people of the town or city using that water are endangered. Again, if such dirt finds its way into milk there is grave danger for anyone who drinks that milk, or if into a sewer emptying upon an oyster bed for anyone eating oysters thus sewage-polluted; or if such sewage is used to water a celery or lettuce or strawberry patch then anyone eating such dirtied celery, lettuce or strawberries may run the risk of losing his life.

WHY DIRTY STREETS ARE DANGEROUS. Dirty streets are dangerous because the dirt in this case may cling to shoes

or other articles of footwear and be carried from the streets into houses where, either as fresh dirt or more often as dry dirt (dust), it may find its way to foods or other articles which either enter or touch the mouths of members of the household. Street dirt is also dangerous when dried up and pulverized or turned into dust, which may be readily lifted and blown about by winds, thus finding its way perhaps directly into the mouths of human beings, or through cracks and crevices or open doors and windows into human habitations and finally into human bodies upon articles of food or drink.

Insects, such as flies and mosquitoes, may also carry dirty particles from dirty streets into houses and deposit them upon food materials in the pantry or upon the table.

We need only stop to think for a moment how really dirty the dirt of a street may be, to understand how dangerous it may become. If we remember that the streets are constantly used by dirty horses, dogs, cats, birds (such as sparrows and pigeons) and occasionally by other animals, when we remember how many people of all sorts thoughtlessly spit in the streets or on the sidewalks,—using the gutter as a kind of spittoon,— when we consider how many loads of manure and other dirty materials are hauled through the streets and how many careless people throw into the streets rubbish of all sorts, such as papers, orange-peel, banana-skins, cigar-stubs and the like, when we realize that a certain number of the animals or human beings whose droppings, spit or rubbish are cast into the streets are suffering from diseases (and sometimes loathsome diseases) and especially from consumption, diphtheria, colds or other complaints, then we can easily see how and why it is that street dirt is dangerous.

WHY DIRTY WATER IS DANGEROUS. It is still easier to understand that water which contains dirt or excreta may be very dangerous, because in no way are the germs of disease more readily taken into the human body than with food and drink. We shall shortly publish in this series a special circu-

lar upon drinking water and disease and all who are interested may procure and read that leaflet.

WHY DIRTY MILK IS DANGEROUS. Dirty milk is dangerous because the dirt most often found in milk is cow dung or else dirt derived from dirty milkmen who have handled the milk with dirty hands. Then, too, milk is good food for some germs or microbes, very much as it is for human beings, and germs will therefore grow and multiply in milk more readily than in water. There will be later a special leaflet in this series upon this subject and all who are interested may procure a copy of it.

DIRTY HANDS AND FACES AND WHY THESE ARE DANGEROUS. Human hands go only too readily almost everywhere and thus very easily become dirty. Children, for example, having soiled their hands may perhaps the next minute put their fingers upon their faces or into their mouths and thus carry dirt, and with that the germs of disease, directly into the body itself, Frequent washing of the hands is a great sanitary safeguard, and for this reason no one should sit down to a meal at which food will be "handled" without having first carefully washed his hands. Workingmen away from home, taking their dinners from a dinner-pail, should be particularly careful to wash their hands, especially if they have been handling paints or other poisonous substances, or dirt in any of its thousand forms.

CLEANLINESS IS NEXT TO GODLINESS. This is an old saying which has come down to us as a result of long and painful experience. Why, of all things, should cleanliness be placed next to godliness? Why should not honesty, or industry, or any one of a thousand things rather than cleanliness, be placed there? The reason probably is that very much as godliness is believed to give to the godly eternal life in the world to come, so cleanliness, as shown by experience, tends to give to the cleanly long life in this world. Dirt and disease, danger and death have been found by hard experience to go together, while cleanliness tends toward safety, health, comfort and long life.

HOW DIRTY PEOPLE KEEP HEALTHY. Everybody who stops to think knows that some dirty people do appear to keep healthy and live long, and some may wonder that this is so. The reason appears to be this: Some people are so strong, robust, hearty and healthy that they can resist almost all ordinary causes of disease. They can get "soaked through" in a rain without catching cold; they can go with wet shoes and stockings, or thinly clad, and yet seem to be none the worse: they may even sometimes be exposed to contagious or infectious diseases without catching them. All this is at first sight hard to explain, but if we remember that the human body is after all a good deal like a machine, such, for example, as a watch or a wagon, we can perhaps realize that, like most machines, some specimens are stronger than others and when exposed to rough usage stand the strain wonderfully well, while some, though looking just as strong, break down easily. It is true that some few human beings are so strong and robust that they can thrive for a time, even in dirt, but these are the exception and not the rule, and even for them dirt is always a danger; for if these same strong people get overworked, or run down, or become dissipated in any way, they, too, generally suffer, just like their weaker neighbors, from dirt and filth.

(A copy of this Essay may be secured free of cost by addressing the Biological Department Massachusetts Institute of Technology, Boston, and enclosing a stamped, addressed envelope.)